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A Field Guide for Identification and Interpretation of the Interior Cedar-Hemlock Zone, Northwestern Transitional Subzone (ICHg), in the Prince Rupert Forest Region

by
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1 INTRODUCTION

This field guide presents a summary of ecological and management information for the Interior Cedar - Hemlock Zone, Northwestern Transitional Subzone (ICHg) in the Prince Rupert Forest Region (Figure 1). The guide is not a comprehensive technical report; information has been extracted from a more detailed technical publication (Haeussler et al. 1985). Additionally, this guide is a first approximation based on extensive sampling and, therefore, is subject to revision as more data become available. The silvicultural recommendations should be considered guidelines, and used as aids in making management decisions.

We assume that the users of this guide have been trained in basic concepts of site, soil, and vegetation evaluation during B.C. Ministry of Forests courses provided by the regional research staff. Consequently, the field guide does not include material on plant identification, hand texturing, or soil classification and humus forms. To identify questionable or unknown plants, refer to Coupe et al. (1982). Consult Haeussler et al. (1985) for further information on principles and philosophy, on methods underpinning the classification, and on the physiography, geology, terrain, and climate of the ICHg; and for more detailed interpretations of the ecosystems of the ICHg. Further enquiries should be directed to the Regional Ecologist, Prince Rupert Region.

The guide includes brief explanations of the biogeoclimatic variants, ecosystem units, and silvicultural prescriptions. Ecological information and identification keys are provided to assist the user in determining the ecological units and making silvicultural interpretations.

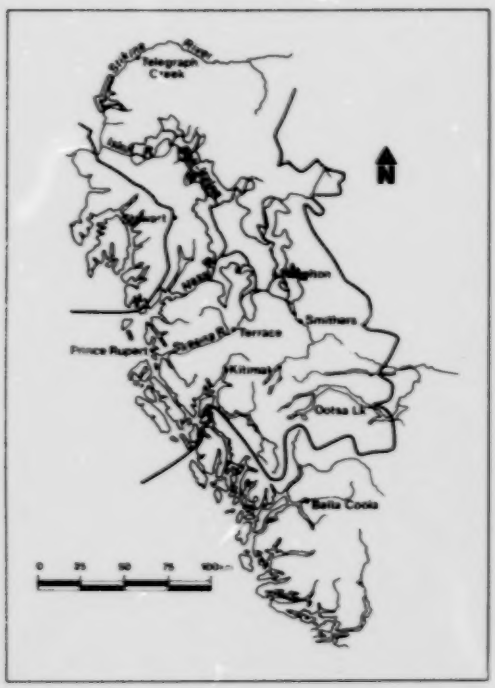
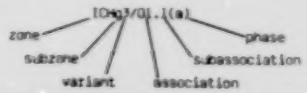


FIGURE 1. The Interior Cedar - Hemlock Zone, Northwestern Transitional Subzone (ICHg) in the Prince Rupert Forest Region.

2 USE OF THE GUIDE

The B.C. Ministry of Forests classification of ecosystems is arranged into a hierarchy that may be thought of as having two primary levels: biogeoclimatic and ecosystematic. Biogeoclimatic categories include the zone, subzone, and variant; ecosystematic categories include the association, subassociation, and phase. A standard code is used to denote these categories. For example:



In addition, connotative common names are generally applied to the various categories, for example the "lithic phase of the Dry hemlock - moss association".

Using the guide involves two main steps: first, identifying the biogeoclimatic subzone and variant; second, identifying the ecosystem association or subassociation, and phase where defined.

The guide is structured in a standard format for each biogeoclimatic variant, with the following information provided to assist the user in identifying the ecological units:

- a map of the biogeoclimatic variant
- edatopic grid
- key to ecosystem units
- slope transect
- habitat features of the ecosystem units
- description and interpretation of the ecosystem units.

2.1 Identifying Subzones and Variants

Section 3 of this guide presents information required to determine the biogeoclimatic subzone and variant, including a map, one table presenting diagnostic floristic elements of the IDFg and neighbouring subzones of the CWH, SBS, and ESSF, and a second table summarizing general

ecological features of the five variants of the IDFg. Larger scale maps are available for reference. Maps at a scale of 1:500 000 are included in Hamussler et al. (1985); 1:250 000 maps are on file in the Prince Rupert Forest Region office in Smithers.

To determine the subzone, the user should first consult a map of appropriate scale and verify by checking with the floristic and environmental features of Tables 1 and 2. If the area in question is near a subzone boundary and doubt still remains after the verification step using Tables 1 and 2, then try to identify the ecosystem for both feasible subzones. Compare the descriptions and interpretations for both ecosystems and apply the information that appears most appropriate. The guide should NOT be used for areas that have not been mapped or have not had their ecosystem units described.

2.2 Identifying Ecosystem Units

Sections 4, 5, 6, and 7 present information for the IDFg1, g1a, g2, and g3, respectively, of the Prince Rupert Forest Region. These sections include information needed to identify the various ecosystem associations, subassociations, and phases of the four biogeoclimatic units; and include recommendations for ecosystem-specific, silvicultural practices. Sections 8 and 9 provide some preliminary information about the incompletely studied IDFgA and g5.

The following steps are suggested for identifying the ecosystem unit:

Step 1.

Consult a biogeoclimatic map and Tables 1 and 2 to determine the subzone and variant in which the site occurs.

Step 2.

Walk the area in question and note the site and soil factors needed to assess the moisture and nutrient regimes. Watch for pronounced differences in topography, wetness, or vegetation that would indicate that more than one ecosystem may be present. For each relatively similar area, determine the moisture and nutrient regime to place the site on the edatopic grid. Consider such factors as landscape

TABLE 1. Synopsis of vegetation characteristics of the ICHg and adjacent biogeoclimatic zones and subzones

Key:**** widespread & dominant *** widespread ** common * uncommon . rare - absent Vegetation characteristics	Biogeoclimatic zones and subzones			
	ICHg Interior cedar - hemlock - western white pine - western larch (transitional) subzone	ICHg Cedar - western hemlock - western white pine - western larch (moist maritime) subzone	ICHg Subboreal spruce zone (wet cool)	ICHg Engelmann spruce - subalpine fir zone (very cold snowy)
Climax tree species				
western hemlock	****	****	.	.
western redcedar	*** southern sections	***	.	.
amabilis fir	* mixed stands only	*** a	.	.
subalpine fir	***	.	**** mixed stands, and climax	****
mountain hemlock	.	.	.	**
Upland vegetation	Interior and intra-zonal characteristics (Fraser Basin subzone) > engelmann	Intra-zonal characteristics (Fraser subzone) > interior, glacial	Interior cedar (Fraser glacial) > engelmann	Cold, dry, interior cedar (Fraser glacial) > engelmann
Seral tree species				
red alder	.	**	.	
lodgepole pine	***	** mainly low elevations	****	**
trembling aspen	*** especially southern sections	* mainly low elevations	***	.
paper birch	*** especially southern sections	* mainly low elevations	**	
black cottonwood	**	** mainly low elevations	**	.
Other tree species				
black spruce	* southern sections only	.	**	.
Rocky Mountain juniper	* southern sections only	.	*	.
Climax shrub and herb species				
Rubus spectabilis	* northern and western sections	***	.	.
Vaccinium membranaceum	* western sections	***	.	.
Menziesia ferruginea	.	***	.	.
V. alaskaense	* northern and western sections	****	.	.
V. ovalifolium	****	****	.	** a
V. membranaceum	***	**	****	****
Valeriana sitchensis	.	.	.	***

TABLE 1. (cont'd)

Key:**** widespread & dominant *** widespread ** common * uncommon . rare - absent Vegetation characteristics	Biogeoclimatic zones and subzones			
	IDFdg Interior Douglas-fir - Ponderosa pine, Northwestern Transitional subzone	CWHdm Coastal Western Hemlock Zone, Northern Dry Maritime subzone (west of ICHg)	SBS Sub-Boreal Spruce Zone (east of ICHg)	ESSF Engelmann Spruce - Subalpine Fir Zone (high elevations above ICHg)
Climax shrub and herb species (cont'd)				
Juniperus (two species)	*	*	*	***
Vaccinium scoparium	*	*	*	***
Artemisia arctica	.	*	*	***
Arctostaphylos nevadensis	*	*	-	***
Seral shrub and herb species				
Corylus cornuta	***(southern sections)	.	.	.
Rosa nutkana	**	***	.	.
Rubus idaeus	*(*)	***	.	.
Amelanchier alnifolia	**	***	*	*
Rosa gymnocarpa	***(especially in southern sections)	*	***	*
Symphoricarpos (several species)	***(* * * *)	*	***	*
Epilobium (several species)	***(* * * *)	*	***	*
Rubus (several species)	***(* * * *)	*	***	*
Vaccinium (several species)	***(* * * *)	*	***	*
Chrysothamnus viscidiflorus, V. nauseosus	***(* * *)	*	***	*
Mosses and liverworts				
Rhytidiadelphus loreus	*	****	*	*
Pleurozium schreberi	*(*)	***	*	*
Dicranum (several species)	*	***	*	*
Aulacomnium palustre	*	***	*	*
Rhytidiadelphus triquetrus	***(*)	**	**	*
Ptilium crista-castrensis	***	*	****	**
Hylocomium (*).	**	*	**	***(*)
Tomentypnum nitens	****	****	***(*)	*(*)
Abietinella (Thuidium)	**	***	*	**(*)

TABLE 2. Synopsis of the biogeoclimatic variants of the ICHg

Characteristics	ICHg1 Upper Moss Basin variant	ICHg2 Lower Moss Basin variant	ICHg3 Foothills variant	ICHg4 Mountain ridge/alpine variant	ICHg5 Subalpine - alpine variant
Geographic distribution	Moss River; Crabapple Junction-Mt. Terry Fox; Mt. Revelstoke N.P.; Hall-Irving Mtn.; Redcap Mtn.; upper Seymour and Eagle River; above 1,700 m southeast.	Moss River valley; Clanwilliam-Avola-Seymour R., mid-elevation east slope contiguous ICHg1.	Lardeau valley floor; Arrow L. lowlands; Eagle R., lower Seymour, Jordan, Eagle, Kalamalka, and Okanagan Lake.	Mountain ridges and alpine areas; Mt. Revelstoke N.P.; Monashee Mtns.	Alpine areas above treeline; Mt. Revelstoke N.P.; Monashee Mtns.
Elevation range (m)	1,150-1,900 m; 1,300-1,900 m in Moss Basin; 1,600-1,750 m in southeast.	1,050-1,600 m Moss Valley; 900-1,600 m Seymour valley.	450-1,200 m.	1,900-2,300 m.	1,900 m.
Climate	Cool, moist, longest and most severe winters, moderately heavy moist of dry snow; humid summer drought.	Cold, moist with moist snow in Moss valley; harsher in southeastern among-mainly valleys; intermediate between g1 and g3 variants; moderate snowfall.	Cold, dry with light, dry snowpack; short frost-free period, cool all seasons, summer warm, relatively dry, hottest temperatures in summer, significant summer drought.	Very heavy precipitation (snow dominant) generally colder, less severe than ICHg1, summers cool, moist cool to no summer drought, shortest growing season due to high altitude and persistent snowpack.	Cool, moist, deep snowpack generally colder, heavy, moist snow, summers cool, moist cool to no summer drought.
Vegetation major tree species	Sw, Sb, (Ba), (Fd) in Mo (Moss); Lw absent.	Sw, Lw, Sb, Se, Fd.	Sw, Pl, Fd, Bl, Ac, Ep, Hw, Lw.	Bl, Sw, Se, a small.	Sw, Pl, Ac, Bl, a small.
Seral stands	Extensive mainly in southern sections; dominants Pl, Bl, Se.	Frequent in Moss valley, less common elsewhere; Pl, Se, Ba, Bl, Ep.	Widespread and dominant. Extensive stands of Bl - Ep - harsher and other shrubs. Also Pl, Lw, Bl, and Ac1.	Extensive, mostly Bl, Pl, Se; Bl on a fire southfacing slopes.	Extensive ex Bl - Ep associations; Pl, Ac1, Lw, Bl.
Zonal plant (sub) association	Sw - (Bl) - Vaccinium globulare - V. alaskaense - V. membranaceum - Rhododendron albiflorum - Menziesia ferruginea	Sw - (Se) - Pachistima myrsinites - Calamagrostis rubescens - Viburnum edule - Rhododendron albiflorum - Menziesia ferruginea - Xerophyllum tenax	Sw - (Lw, Bl, Se) - Hylocomium splendens - Calamagrostis rubescens - Rhododendron albiflorum - Menziesia ferruginea - Xerophyllum tenax	Sw - Bl - (Lw) - Vaccinium membranaceum - V. globulare - Rhododendron albiflorum - Menziesia ferruginea - Luzula parviflora - Phyllodoce empetriformis	Sw - Vaccinium myrtilloides - V. globulare - Phyllodoce empetriformis - Cassiope mertensiana - Xerophyllum tenax

TABLE 2. (cont'd)

Characteristics	ICHgl Upper Moss Basin variant	ICHg2 Lower Moss Basin variant	ICHg3 Hazelton variant	ICHgk Horsefly - Quesnel-Irving variant	ICHgQ Quesnel - Skeena variant
Miscellaneous notes	(Ba phase): Ep - Ba - [illegible] - Y. [illegible] - Sx - [illegible] - Fdi - [illegible]	extensive moss carpets may cover even subhygric sites, especially in south-eastern sections	climax Ha stands scarce except on north-facing slopes. Most stands contain seral remnants of Fd, Sxw& [illegible], Sxw [illegible], Sw [illegible], Cw [illegible], etc.	extensive areas of subhygric to hygric Bl - Sx - [illegible] northern - [illegible] - [illegible] - Ep - Ba.	extensive Sx - Bl - [illegible] - [illegible] - [illegible] - [illegible] - [illegible] - [illegible] - [illegible] forests.
Understory vegetation features	[illegible] diagnostic present; V. [illegible] and Rubus pedatus abundant.	[illegible] diagnostic, Rubus pedatus lacking; [illegible] [illegible] scattered on zonal sites.	[illegible] diagnostic, V. [illegible], Rubus pedatus lacking on zonal sites.	[illegible] diagnostic, V. [illegible], Rubus pedatus abundant.	[illegible] diagnostic, V. [illegible], Rubus pedatus abundant.
Landforms: lower elevations (valley floors)	fluvial terraces and morainal blankets.	fluvial terraces and glaciofluvial outwash; minor morainal blankets.	extensive fluvial terraces and active floodplains; organic deposits.	fluvial terraces and morainal blankets.	extensive fluvial terraces and active floodplains, morainal blankets.
Middle to upper elevations	morainal and/or colluvial veneers and blankets (Ba phase: colluvial veneers and blankets).	morainal and/or colluvial veneers and blankets.	morainal blankets and veneers.	morainal veneers and/or blankets; colluvial veneers on steepest slopes.	colluvial and morainal veneers and/or blankets.
Zonal Soils:	Orthic Humo-Ferric Podzols (Ba phase: Orthic Ferro-Humic Podzols).	Humoluvic Gray Luvisols; Podzolic Gray Luvisols; Orthic Humo-Ferric Podzols (minor).	Orthic Humo-Ferric Podzols; Podzolic Gray Luvisols.	Orthic Humo-Ferric Podzols.	Orthic Humo-Ferric Podzols.

1 Tree species symbols as in Appendix 11.2.

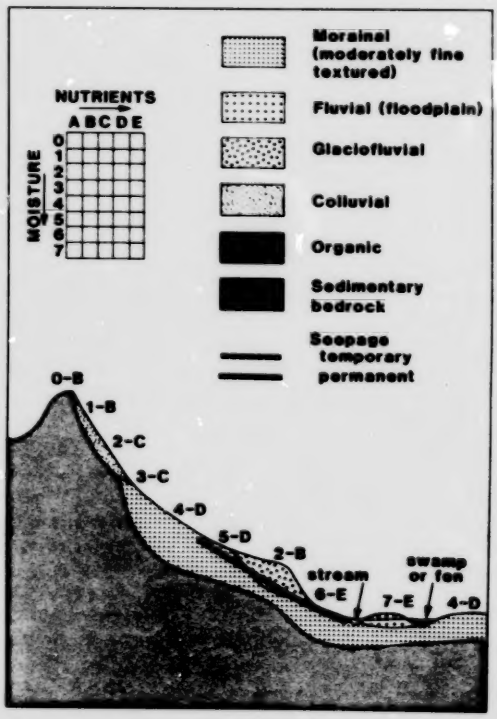


FIGURE 2. Generalized cross-section of edatopic positions.

position, slope, and aspect; soil texture and coarse fragments; humus form and thickness; depth to water table or mottling; and soil depth and rooting depth. Note the ecosystem indicated for this part of the edatopic grid. Figure 2 illustrates the schematic relationships among moisture and nutrient regimes along a typical slope profile.

(Steps 3 through 6 apply to each relatively uniform area identified in Steps 1 and 2)

Step 3.
Note the plant species on the site and their abundance.

Step 4.
Use the information from Steps 1, 2 and 3 to work through the ecosystem key for the subzone. Proceed to the indicated ecosystem. If this ecosystem encompasses the moisture and nutrient regimes indicated by Step 2, proceed to Step 5; if not, recheck your observations and attempt to obtain agreement. References to figures that depict the relative prominence of species in the various ecosystems may be helpful at this point.

Step 5.
Compare the site and its soil and vegetation with that summarized for the indicated ecosystem association (or subassociation, and phase if defined). If there is reasonable fit, proceed to Step 6; if not, record all pertinent data and discuss with regional ecology staff.

Step 6.
Consider the management interpretations suggested for the ecosystem. These are located on the pages facing the ecosystem descriptions. Modify as necessary to suit site-specific and stand-specific conditions.

3 BIOGEOCLIMATIC UNITS

The Interior Cedar - Hemlock Biogeoclimatic Zone (ICH) in the Prince Rupert Forest Region consists of one subzone, the ICHg or Northwestern Transitional Subzone.

The ICHg lies just east of the Coast Mountains in the drainages of the Skeena, Nass, Iskut, and Stikine rivers. It encompasses most of the Nass Basin physiographic subdivision and adjacent parts of the Skeena and Hazelton Mountains. Valley floors and lower to mid-mountain slopes ranging in elevation from 100 m to 1000 m are included within the ICHg. The ICHg occupies a transitional region that experiences elements of both coastal and interior climates. Western sections have a predominantly coastal-transitional climate, while eastern sections show dominantly continental or sub-boreal climatic influences. Precipitation, numbers of frost-free days, and winter temperatures all decrease significantly from west to east, while summer-time temperatures increase.

Elevational changes also profoundly influence regional climate and result in different biogeoclimatic units. In general, high elevation mountain slopes are cooler, more humid, and receive more snow than low elevation valley bottoms. However, because cold air drains downslope, creating temperature inversions, the greatest temperature extremes and heaviest frosts are often experienced on the valley floor, while mid-mountain slopes have a more equable climate.

The ICHg is bounded to the west by subzones of the Coastal Western Hemlock Zone (CWH) and to the east by the Sub-Boreal Spruce Zone (SBS). The Engelmann Spruce - Subalpine Fir Zone (ESSF) lies at subalpine elevations above the ICHg.

3.1 Distinguishing Floristic Features of the ICHg and Neighbouring Biogeoclimatic Units

The transitional nature of the ICHg climate is reflected in the vegetation of the subzone, which combines elements of both coastal and

interior flora. Climax forests are dominated by western hemlock,[1] which occurs together with subalpine fir, hybrid spruce, and western redcedar.

Fire has had a major influence on the development of many plant communities in the subzone. Seral (nonclimax) stands composed of lodgepole pine, trembling aspen, paper birch, hybrid spruce, and subalpine fir dominate lower elevations in many parts of the ICHg. Even older stands, approaching climax, usually contain remnant individuals of seral communities. Except in sheltered locations such as middle elevation valleys and some north-facing slopes, it is difficult to find a climax stand in the ICHg that has not been disturbed by fire within the past few centuries.

The CWHf (to the west of ICHg) has a coastal-transitional climate and is moister than the ICHg. The forests have a definite coastal character with widespread abundance of amabilis fir and scarcity of subalpine fir. The SBS Zone (to the east of the ICHg) has an interior continental climate and occupies the lower elevations adjacent to the ICHg Subzone. The SBS Zone lacks the coastal tree species such as western hemlock, western redcedar, and amabilis fir. Spruce and subalpine fir dominate most mature forests.

The ESSF Zone lies at subalpine elevations above the ICHg. Its lower elevational limits drop significantly as one proceeds from south to north. Vegetationally, the ESSF lacks western hemlock, western redcedar, and amabilis fir. It is also rich in herbaceous species.

Specific vegetation features that characterize the ICHg and can be used to distinguish it from neighbouring biogeoclimatic zones and subzones are listed in Table 1.

3.2 Synopsis of the Variants of the ICHg

Within the ICHg there is considerable climatic variation. This variation corresponds primarily to differences in longitude, latitude, elevation, and surrounding topography within the subzone. The climatic

---

[1]Plant names used in the guide are listed in Appendix 1.

variation is strongly reflected in vegetation characteristics such as the distribution of tree species within the subzone, and patterns of plant communities in the landscape. The ICHg Subzone is divided into five distinct biogeoclimatic variants:

ICHg1: Upper Nass Basin Variant
ICHg2: Lower Nass Basin Variant
ICHg3: Hazelton Variant
ICHg4: Meziadin - Bell-Irving Variant
ICHg5: Iskut - Stikine Variant

Figure 3 shows the distribution of variants within the ICHg. General characteristics of the variants are summarized in Table 2. Figure 4 profile diagrams show the elevational sequence or stratification of the variants on typical mountain slopes in the Nass, Bulkley, and Skeena drainages.

3.2.1 ICHg1 - Upper Nass Basin Variant

The ICHg1 variant covers the undulating terrain that extends roughly north and east of Cranberry Junction, as well as some middle elevations in the southeastern part of the subzone. Hummocky glacial till deposits derived from sedimentary bedrock dominate the landscape. Elevation ranges from 300 to 950 m in the Nass Basin to 750 to 1100 m in the southeastern portion. The general climate is cool and moist with a shorter growing season than in the ICHg2 or ICHg3. The vegetation is mainly composed of mature western hemlock forests mixed with subalpine fir. Subalpine fir and hybrid spruce dominate on the low-lying, wetter sites. Amabilis fir is limited to southern portions of the variant but is under severe climatic stress and often grows poorly. Where Amabilis fir is found in this variant, it is consioered the ICHg1a or Amabilis Fir Phase. Western redcedar is absent in the ICHg1, thus distinguishing the variant from the ICHg2 and ICHg3.

Seral stands are not extensive except in some areas along the Nass River and in the southern portions of the variant above the ICHg2 and 3. Lodgepole pine is the dominant seral species, with trembling aspen and paper birch common, especially on south-facing slopes.

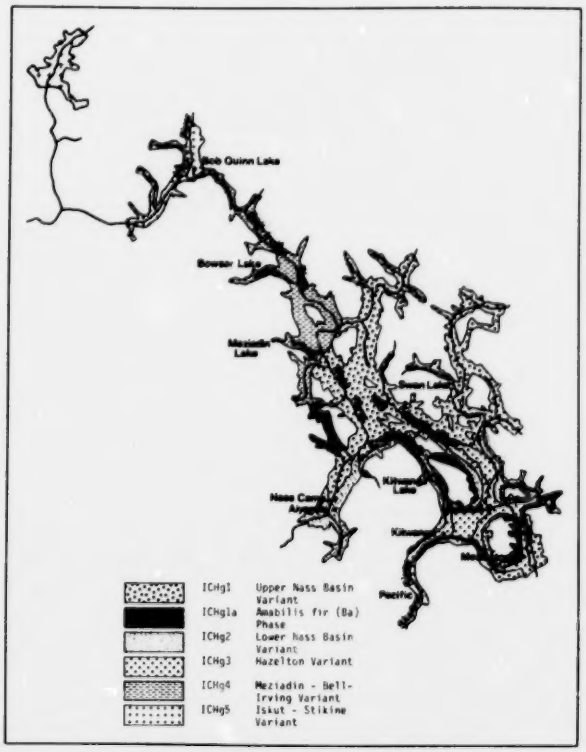


FIGURE 3. Biogeoclimatic Variants of the Interior Cedar - Hemlock Northwestern Transitional Subzone (ICHg).

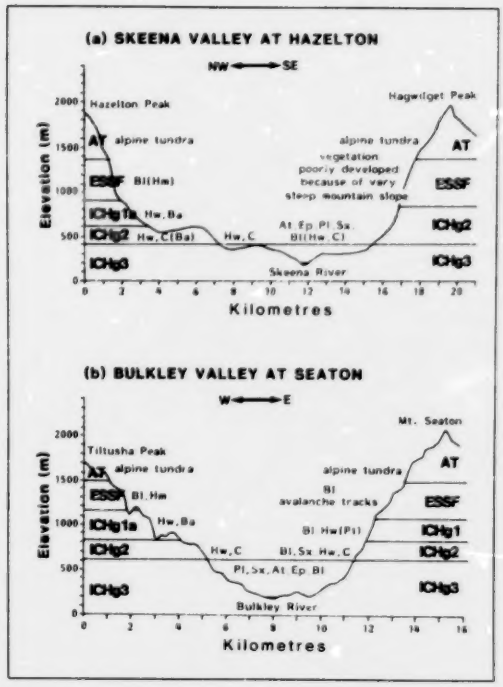


FIGURE 4a and b. Representative valley profiles showing distribution of biogeoclimatic units. Skeena Valley at Hazelton (a) and Bulkley Valley at Seaton (b).

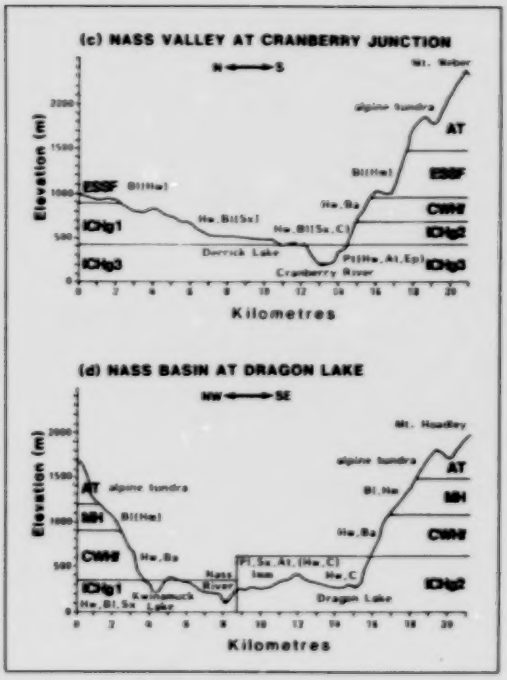


FIGURE 4c and d. Representative valley profiles showing distribution of biogeoclimatic units. Nass Valley at Cranberry Junction (c) and Nass Basin at Dragon Lake (d).

3.2.2 IDHgla - Upper Nass Basin Variant, Amabilis Fir Phase

On some northeastern slopes in the Nass Basin and in small sheltered valleys of the Rocher de Boule and Kispiox ranges, and between approximately 750 and 1100 m elevation, there exist enclaves of seemingly coastal forest of western hemlock and amabilis fir. Such areas are designated the IDHgla or Amabilis Fir Phase of the Upper Nass Basin Variant. The middle Kinskuch River valley has probably the largest concentration of the IDHgla. The IDHgla consists of old-growth stands that show no signs of past fire for many generations. Trees in the amabilis fir phase often reach coastal dimensions (amabilis fir and spruce between 45-50 m in height are not uncommon), and typically coastal understory species such as Rubus spectabilis and Rhytidiadelphus loreus are present. Soils are frequently Ferro-Humic Podzols and humus layers are unusually thick. In general, the IDHgla bears a very strong resemblance to higher elevation forests of the Coastal Western Hemlock biogeoclimatic zone.

3.2.3 IDHg2 - Lower Nass Basin Variant

The IDHg2 or Lower Nass Basin Variant is found in the Nass River valley from Cranberry Junction to the Tseax River valley, near Aiyansh. In the Nass drainage it ranges from the valley floor to an elevation of approximately 600 m. In the Skeena drainage, the IDHg2 occurs as a mid-elevation belt above the Hazelton (IDHg3) variant. The IDHg2 belt begins anywhere between 450 and 600 m in elevation and extends upslope to between 750 and 900 m. A discontinuous belt of IDHg1 is found above the IDHg2 in southeastern sections of the subzone.

Climax forests in the IDHg2 are dominated by western hemlock and western redcedar, together with lesser amounts of subalpine fir and spruce. Amabilis fir is generally absent.

Seral stands are quite common at lower elevations in the IDHg2, particularly in the Nass valley. However, for the most part, they do not seem as firmly established as the extensive seral stands in the IDHg3. Most mature hemlock-cedar stands contain a few overmature individuals of lodgepole pine, paper birch, or trembling aspen, indicating a relatively recent fire origin.

3.2.4 IDHg3 - Hazelton Variant

The IDHg3 or Hazelton Variant is centred on the valley floor of the Skeena River between Tenas Hill and Legate Creek. Arms of the IDHg3 extend up major tributaries of the Skeena, including the Bulkley River below Trout Creek, the Kispiox River below Sweetin River, and the Kitwanga, Kitsequecla, and Suskwa river valleys. From the valley bottoms, the IDHg3 extends upslope to between 450 and 600 m in elevation.

West of Cedarvale the IDHg3 borders -- at its upper elevations -- on the Northern Drier Maritime subzone of the Coastal Western Hemlock Zone (CWHf). To the east, it is bounded at its upper elevations by the IDHg2.

The vegetation of the Hazelton Variant reflects the influence of frequent natural fire and widespread human disturbance. The IDHg3 may also be referred to as the aspen variant because of the extensive seral stands of trembling aspen and paper birch that have become established as a result of the fires and land clearing. These deciduous stands have dense shrub and herb layers and little or no moss on the forest floor. Corylus cornuta is characteristic of the Hazelton variant. It is a dominant shrub within the variant and is rare or absent outside the IDHg3.

Lodgepole pine, spruce, and subalpine fir are the dominant coniferous tree species. In some areas of the IDHg3, stands bear a strong resemblance to those found in the Sub-Boreal Spruce Zone (SBS) because subalpine fir and spruce are the dominant species reproducing under the tree canopy.

Western hemlock and western redcedar are the true climatic climax tree species in the IDHg3, but their distribution is restricted. Small patches are scattered throughout the landscape and larger stands occur mainly on north-facing slopes and at the higher elevations.

There are few floristic criteria that can be used to distinguish climax stands of the IDHg3 from those of IDHg2 where the two variants occur one above the other on a mountain slope. Elevation and the relative abundance of successional stands are the two major criteria used to differentiate the variants in such areas.

3.2.5 ICHg4 - Meziadin - Bell-Irving Variant

The Meziadin - Bell-Irving Variant of the ICHg4 extends from the White River to Ningunsaw Pass. On the Bell-Irving River, the variant extends south to Irving Creek and wraps around Mount Bell-Irving to the west. The occurrence of lodgepole pine terraces near the confluence of the Nass and Meziadin rivers marks the beginning of the ICHgl. The ICHg4 extends into major tributary valleys of the Bell- Irving including Surveyors Creek, Bowser Lake, Taft Creek, Deltaic Creek, and Teigen Creek. Considerable elevational variation is exhibited. In the main valley the variant extends to 800 m. Highest elevations are attained on sheltered north-facing slopes (up to 1000 m), while in narrow side valleys cold air drainage forces the variant below 700 m. In the south the variant reaches its minimum elevation of 240 m near Meziadin Lake and in the White River drainage rarely exceeds 600 m.

The ICHg4 can be referred to as a "snowy" variant because of the excessive amounts of snowfall. Normal maximum snowpacks are estimated at between 2.5 and 5 m in depth, well over twice that of equivalent elevations in the ICHgl. In addition to snowy winters, the variant probably has relatively cool and moist growing seasons.

The predominance of Oplopanax horridus on mesic and wetter sites suggests a rich, moist growing environment. Mesic sites characteristically have a mixture of Oplopanax horridus and Vaccinium spp., along with subalpine fir and western hemlock. Subalpine fir dominates in valley bottom positions (responding to snow accumulation and cold air ponding), while western hemlock is the major species on topographic humps and on steep slopes. Western hemlock is the single dominant only on submesic and xeric sites, including rock outcrops and ridgetops. Spruce hybrids (Picea glauca X engelmannii and P. glauca X sitchensis) grow relatively well, but rarely reach dominant status in terms of percent cover. Subalpine fir grows exceptionally well and often attains record size. Western redcedar is absent and amabilis fir occurs sporadically in the White River drainage. Mountain hemlock, a species well adapted to heavy snowpacks, is found at unusually low elevations in the ICHg4. Because of the suitability of subalpine fir to a cold snowy climate, it is the primary species recommended for planting. Presently, nursery culturing problems exist with subalpine fir. For the immediate future only experimental plantings of subalpine fir will be

conducted. Until subalpine fir nursery cultivation concerns have been overcome, only spruce and hemlock will be considered for the bulk of the operational planting.[2]

Fire has had little impact on the vegetation of the variant. Trembling aspen, lodgepole pine, and paper birch are virtually lacking. The only typical seral species is black cottonwood, which occurs infrequently on upland sites and pioneers on sandbars.

All side valleys in the IDHg4 are strongly affected by avalanching. Avalanched slopes are typically vegetated with a continuous tangled cover of Alnus viridis ssp. sinuata, interspersed with large patches of robust Athyrium filix-femina and Dryopteris assimilis. Similar vegetation also occupies shrubby forest openings in the Bell-Irving valley. The origin of these openings is unclear, although they could have resulted from old fires, or blowdown combined with the excessive snowfall.

3.2.6 IDHg5 - Iskut - Stikine Variant

The IDHg5 Variant has received little study because of its remoteness. Based on existing information, the IDHg5 seems most similar to the IDHg1 in its ecological characteristics.

The Iskut - Stikine Variant occupies low to medium elevations (150-900 m) in the central part of the Iskut and Stikine river valleys, east of the crest of the Coast Mountains. In the Iskut drainage, the IDHg5 extends from the lower Ningunsaw River and Durham-Ball creeks downstream to Snippaker Creek. The variant occurs in the Stikine drainage from Dokdaon Creek to just below the Scud River.

Western hemlock is the climatic climax species of the IDHg5 and forms extensive, old-growth, often "decadent" stands. Western redcedar is absent. Subalpine fir and hybrid Sitka x white spruce sometimes occur in mature forest on zonal sites; both species are abundant on moist rich sites and in areas of cold air drainage or ponding. Black cottonwood, along with the hybrid spruce, forms floodplain forests. Lodgepole pine, aspen, and paper birch are scattered, forming seral forests in burned-over areas, especially in the vicinity of Bob Quinn Lake.

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[2] G.D. Lloyd, pers. comm., Feb. 1987.

4 THE ICHgl VARIANT

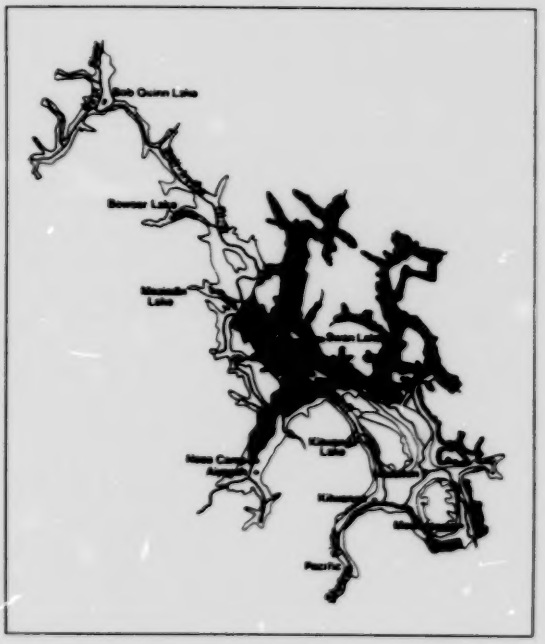


FIGURE 5. The Northwestern Transitional Interior Cedar - Hemlock Subzone, Upper Nass Basin Variant (ICHgl) in the Prince Rupert Forest Region.

4.1 Ecosystem Units of the ICHgl

/01 Zonal Hemlock - Moss ecosystem association

/01(1) Vaccinium variation

/02 Pine - Lichen ecosystem association

/03 Dry Hemlock - Moss ecosystem association

/04 Devil's Club - Oak Fern - Feathermoss ecosystem association

/05 Devil's Club - Fern - Leafy Moss ecosystem association

/06 Horsetail - (Skunk Cabbage) Swamp ecosystem association

Seral ecosystem association:

/07 Floodplain Cottonwood seral ecosystem association

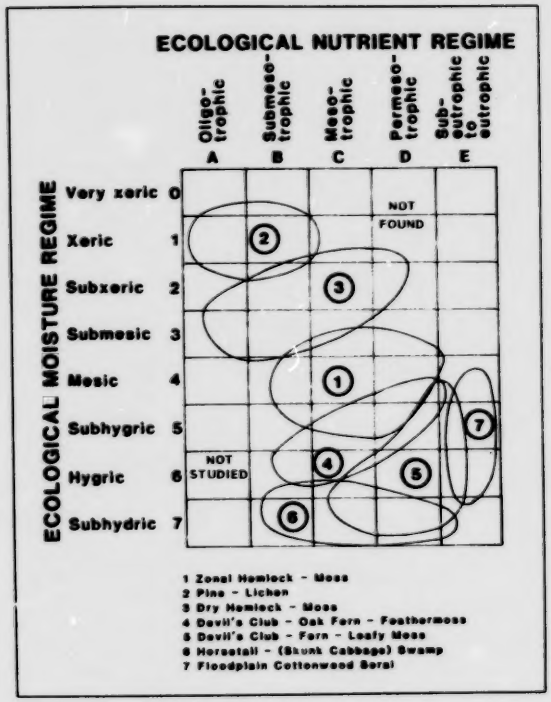


FIGURE 6. Edatopic grid of the IDFgl.

4.2 Seral Variations - ICHgl

Throughout much of the ICHgl, successional stands are either of minor occurrence or bear a strong resemblance to the climax condition. However, in some low elevation or southern portions of the variant, such as along the Nass River just north of Cranberry Junction and in the Kispiox Valley, seral stands are widespread.

The composition of these seral stands is highly variable. Tree cover is dominated by various combinations of lodgepole pine, subalpine fir, spruce, aspen, paper birch, or black cottonwood. Pine tends to dominate on sites belonging to the Pine - Lichen (ICHgl/02) and Dry Hemlock - Moss (ICHgl/03) ecosystem association, while moister ecosystems contain more deciduous species and spruce.

There is a general tendency for seral variations of a given ecosystem unit to have much better developed shrub and herb layers than the climax. The diversity of species is also greater because many light or nutrient-demanding plants are still present in seral vegetation. Typical shrubs include Rubus parviflorus, Amelanchier alnifolia, Shepherdia canadensis, Rosa acicularis, and Viburnum edule. Arnica cordifolia, Vaccinium caespitosum, Oryzopsis asperifolia, O. pungens, Rubus pubescens, Aralia nudicaulis, Lathyrus nevadensis, Smilacina stellata, and Osmorhiza chilensis are characteristic herbs of the seral stands.

In many stands, particularly those in the latter stages of succession, the successional trend is evident. Hemlock regeneration is common in understory layers, climax shrubs and herbs predominate, and a carpet of feathermosses may be the dominant feature of the forest floor. Wher stands of this nature are encountered in the field, classify them according to the expected climax ecosystem association and refer to the silvicultural interpretation for that ecosystem unit. Note, however, that the brush hazard of the site is often significantly increased because of the presence of deciduous trees and seral shrub species. Undesirable advance regeneration of subalpine fir may also be present and may create a regeneration problem after logging.

Other seral stands give no obvious indication of their successional trend. These are primarily stands with deciduous overstories, very dense shrub and herb layers, and little or no moss layer. Such seral stands are most common at the south end of the ICHg1, adjacent to the ICHg3. Cornus sericea or Corylus cornuta may be present in the shrub layer. When stands of this nature are encountered in the field, locate an appropriate ecosystem description of a seral ecosystem association in the ICHg3 Variant, and refer to the management interpretations for that ecosystem unit.

4.3 Key to Ecosystem Units of the ICHgl

A Ecosystems with moderate to poor tree growth ..... B

AA Ecosystems with good tree growth ..... G

B Equisetum spp. dominate herb layer

HORSETAIL - (SKUNK CABBAGE) SWAMP (ICHgl/06)

BB Equisetum spp. rare or lacking in herb layer C

C Pl dominates main canopy; upper slopes and ridge crests or dry terraces ..... D

D Moss layer dominated by lichens; Pl regeneration frequent

PINE - LICHEN (ICHgl/02)

DD Moss layer a mixture of lichens and mosses; Hw dominates regeneration

DRY HEMLOCK - MOSS (ICHgl/03)

CC Hw dominates main canopy; generally middle slope positions ..... E

E Dense canopy of small short trees; Sx rare or lacking; herb layer very poorly developed

DRY HEMLOCK - MOSS (ICHgl/03)

EE Moderately dense stands of small to medium-sized trees; Sx often present; herb layer poorly to moderately developed ..... F

F Shrub layers poorly developed

ZONAL HEMLOCK - MOSS (ICHgl/01)

FF Shrub layers well developed

ZONAL HEMLOCK - MOSS: VACCINIUM VARIATION [ICHgl/01(1)]

G Act dominates main canopy; floodplain islands and river bottomlands

FLOODPLAIN COTTONWOOD SERAL (ICHgl/07)

GG Act rare or lacking in main canopy; generally lower slope positions ..... H

H Herb layer dominated by ferns (Gymnocarpium, Dryopteris, and Athyrium); feathermosses confined to hummocks and decaying wood

DEVIL'S CLUB - FERN - LEAFY MOSS (ICHg1/05)

HH Athyrium and Dryopteris spp. rare or lacking; moderately well-developed feathermoss carpet

DEVIL'S CLUB - OAK FERN - FEATHERMOSS (ICHg1/04)

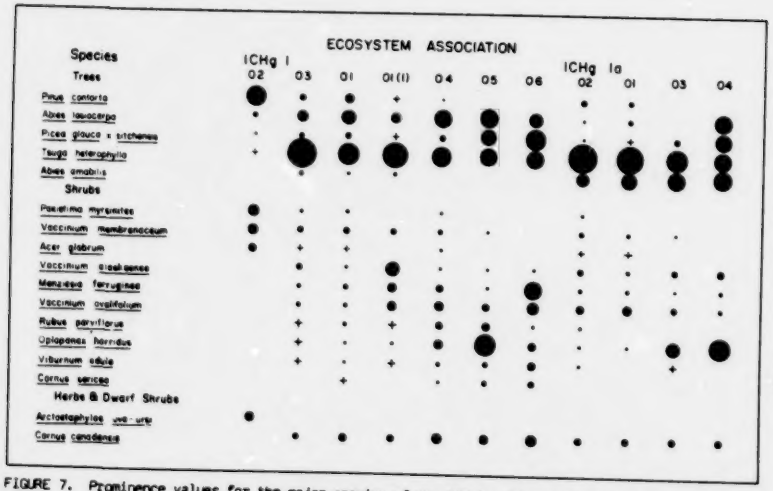


FIGURE 7. Prominence values for the major species of the ICHg1. Diameters of the circles are proportional to the prominance value, which is a measure of plant abundance incorporating both frequency and cover of the species in our sample plots. Prominance value = mean cover multiplied by the square root of freqency. + = trace.

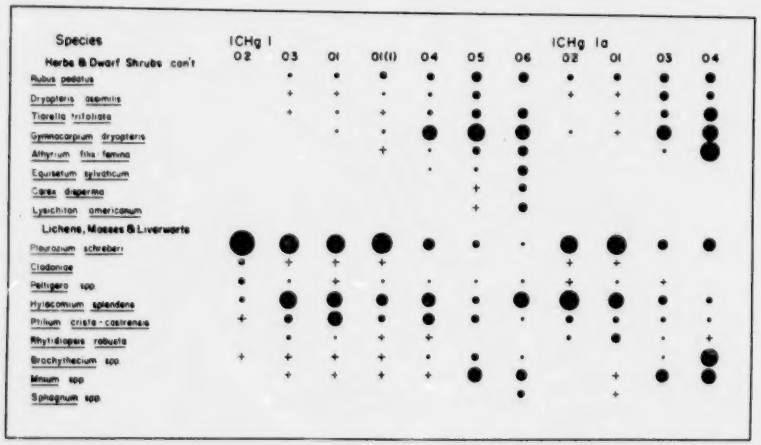


FIGURE 7. (cont'd)

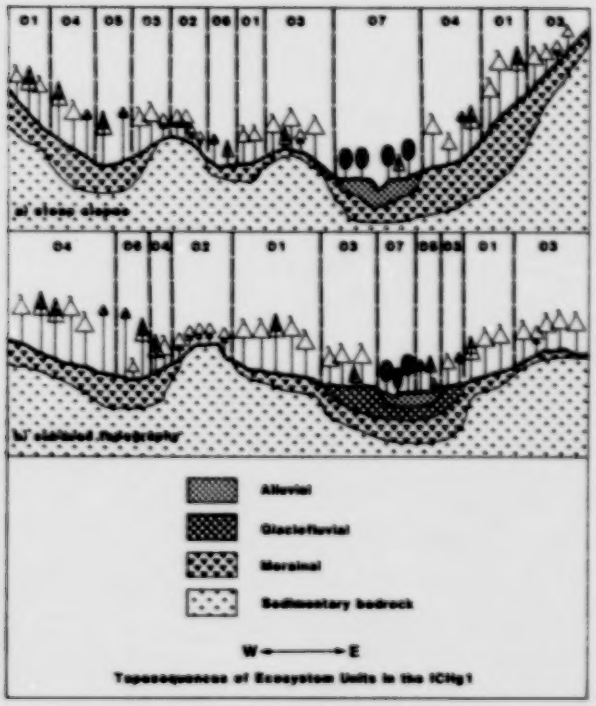

01 04 05 03 02 06 01 02 07 04 01 03
a) close slopes
04 06 04 02 01 03 07 06 02 01 03
b) distant footslopes
Alluvial
Glaciofluvial
Morainal
Sedimentary bedrock
W ← → E
Toposequences of Ecosystem Units in the ICHg1

FIGURE 8. Toposequences of ecosystems in the ICHg1. Tree symbols as in Appendix 11.2.

TABLE 3. Habitat features of ecosystem units in the IDHgI

Habitat feature	30	49	51	51(1)	54	55	58	67
Slope class	level to mod. sloping	level to mod. steep	gentle to mod. steep	gently rolling to mod. steep	gentle to mod. sloping	flat to gently sloping	level	level
Slope position	slope crests, terraces	upper, ridges	middle, lower	middle	middle, lower	lower, valley floors	depressions	valley floor
Soil parent materials[1]	M,Fl	M,Fl,F	M,C,Fl	M,C,Fl	F,M,C	F,M	O	F
Soil texture[2]	L	L,CL	L,CL	L	L,SL	SiL	CL	variable
Drainage class	rapid	well	mod. well	well	mod. well	well, imperfect	poor	well
Moisture regime	xeric	subxeric	xeric	xeric	subhygric	hygric	subhygric	subhygric, hygric
Nutrient regime	submesotrophic	submesotrophic	mesotrophic	mesotrophic	permesotrophic	permesotrophic	mesoeutrophic	permesotrophic, eutrophic
Soil classification[3]	XFP, IMB, H	XFP, IMB	XFP	XFP	XFP	S, FG	S, M	H
Humus form classification[4]	MM	MM	MM	MM	MM	MM, MAM	MAM, MAF	MM, MAM
Rooting depth (cm)	variable	>30	>30	30-50	variable	<35	30-50	>50
Thickness humus layer (cm)	3-5	5-10	5-10	5-11	5-10	5-10	>10	>5
Mineral soil pH (mean)	4.3	4.6	4.5	4.3	5.0	5.1	4.9	6.5
Humus pH (mean)	3.7	3.9	3.7	3.1	3.5	4.7	4.9	6.1

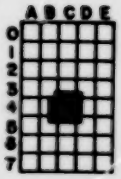
[1] Abbreviations of soil parent materials: C - colluvial; F - fluvial; Fl - glaciofluvial; M - morainal; O - organic; RO - rock outcrop.
[2] Abbreviations of soil textures: CL - clay loam; L - loam; LS - loamy sand; SL - sandy loam; SiL - silt loam.
[3] Abbreviations of soil undersigned groups: IMB - Dystric Brunisols; S - Podzols; XFP - Humo-Ferric Podzols; M - Mesisols; FG - Fibrisols Gleo Luvisols; H - Hemisols.
[4] Abbreviations of humus form classification: MM - Hylomors; MAM - Hemimors; MAF - Mormors; MHM - Hydromors; FIM - Mixomors; MM - Humimors; MAF - Humimors.

TABLE 4. Summary of silvicultural prescriptions and guidelines for the ICHg1

Ecosystem unit	Species choice: Preferred	Species choice: Acceptable	Primary method of establishment	Site preparation: Mech.	Site preparation: Burning	Brush potential
/01 /01(1)	Sx, (Pl)	Pl, (Hw)	Planting	OK	OK	Low
/02	A V O I D	L O G G I N G				
/03	Pl	(Sx), (At)	Natural	OK	AVOID	Very low
/04	Sx	(Hw)	Planting	AVOID	(OK)	Moderate
/05	Sx	Pl, (Hw)	Planting	AVOID	OK	Moderate to severe
/06	Sx	(Bl)	Natural	AVOID	AVOID	Variable
/07	Sx	Act, (At)	Planting	AVOID	OK	Severe

4.5 Description and Interpretation of Ecosystem Units of the IDHg1

ZONAL HEMLOCK - MOSS (IDHg1/01)



SLOPE POSITIONS: Middle to lower.

SLOPE RANGE: Gentle to moderately steep.

ASPECT: All.

VEGETATION LAYERS[1]	SOILS
TREE: moderately dense stands of small to medium-sized trees. Hw (Bl) (Sxw)	TERRAIN/PARENT MATERIALS: Morainal blankets; some colluvial blankets; glaciofluvial deposits.
SHRUB: very poorly developed. (Vaccinium membranaceum) (Vaccinium ovalifolium) (Vaccinium alaskaense) (Menziesia ferruginea) (Oplopanax horridus)	SOIL NAME: Humo-Ferric Podzols. TEXTURE: Loam to loamy sand. DRAINAGE: Good.
HERB: poorly developed. (Cornus canadensis) (Rubus pedatus) (Orthilia secunda) (Clintonia uniflora) (Pyrola asarifolia) (Streptopus spp.)	HUMUS FORM: Hemimors. EFFECTIVE ROOTING: Deep; generally greater than 50 cm.
MOSS: a well-developed feather-moss carpet; good vigour. Hylocomium splendens Pleurozium schreberi Ptilium crista-castrensis (Brachythecium spp.)	OTHER FEATURES: Lithic contacts lacking in upper 100 cm of profile.

COMMENTS: This association represents the climatic climax for the IDHg1 and is widespread throughout the variant, especially at the lower elevations. Vegetation differences between this ecosystem association and the Dry Hemlock - Moss e.a. (IDHg1/03) are subtle. The Zonal Hemlock - Moss e.a. generally has higher diversity and vigour of understory species.

[1] Parentheses indicate species that may have low cover or may not be consistently present.

ZONAL HEMLOCK - MOSS (ICHgl/01)

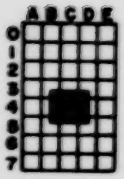
ACTIVITY OR CONCERN	
Species choice:	
Preferred	- Sx, (Pl).
Acceptable	- Pl. - Hw, if area is unburned and humus is thicker than 10 cm.
Logging:	- summer or winter. - AVOID SCALPING.
Site preparation:	
Mechanical	- light mixing of humus with mineral soil may improve site, otherwise avoid. - DO NOT SCALP. - avoid excessive disturbance if aspen is prevalent.
Prescribed fire	- OK if humus is thicker than 10 cm or if advanced regeneration is unacceptable.
Brush hazard:	- low, unless there is a significant deciduous component in the mature stand. - ASSESS AT TIME OF SURVIVAL EXAMINATION.
Reforestation:	- PLANT SPRUCE, especially if advanced regeneration is unacceptable.
Other comments:	- species conversion to shade-intolerant spruce and/or pine is desirable.

ZONAL HEMLOCK - MOSS: VACCINIUM VARIATION (HDHg1/01(1))

SLOPE POSITIONS: Mid-slopes (generally).

SLOPE RANGE: Gently rolling to moderately steep.

ASPECT: All.



VEGETATION LAYERS	SOILS
TREE: stands usually not dense. Hw (Bl)	TERRAIN/PARENT MATERIALS: Morainal (colluvial) veneers and occasionally blankets; some glaciofluvial deposits.
SHRUB: usually well-developed. Vaccinium alaskaense Menziesia ferruginea Vaccinium ovalifolium Vaccinium membranaceum	SOIL NAME: Humo-Ferric Podzols; (Gleyed Podzolic Gray Luvisols).
HERB: sparse to moderately well developed. Cornus canadensis Rubus pedatus Orthilia secunda (Lycopodium annotinum) (Pyrola asarifolia) (Linnaea borealis)	TEXTURE: Loam to sandy loam.
	DRAINAGE: Good.
	HUMUS FORM: Hemimors.
MOSS: a well-developed, continuous carpet of feathermosses. Pleurozium schreberi Hylocomium splendens Ptilium crista-castrensis Brachythecium spp. Barbilophozia spp.	EFFECTIVE ROOTING: Shallow (30-50 cm). OTHER FEATURES: Shallow soils with bedrock commonly within 60 cm of surface.

COMMENTS: Widespread in the upper Kispiox and Kwinageese river valleys; sporadic and mainly at higher elevations in other parts of the HDHg1.

ZONAL HEMLOCK - MOSS: VACCINIUM VARIATION [ICHg1/01(1)]

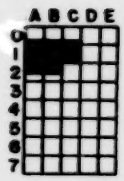
ACTIVITY OR CONCERN	
Species choice:	
Preferred	- Sx, (Pl).
Acceptable	- Pl. - Hw, if area is unburned and humus is thicker than 10 cm.
Logging:	- summer or winter.
Site preparation:	
Mechanical	- light mixing of humus with mineral soil may improve site, otherwise avoid. - DO NOT SCALP. - avoid excessive disturbance if aspen is prevalent.
Prescribed fire	- OK if humus is thicker than 10 cm or if advanced regeneration is unacceptable.
Brush hazard:	- low, unless there is a significant deciduous component in the mature stand. - ASSESS AT TIME OF SURVIVAL EXAMINATION.
Reforestation:	- PLANT SPRUCE, especially if advanced regeneration is unacceptable.
Other comments:	- species conversion to shade-intolerant spruce and/or pine is desirable.

PINE - LICHEN (ICHgl/02)

SLOPE POSITIONS: Slope apices and ridge crests; terraces.

SLOPE RANGE: Level to moderately sloping.

ASPECT: All.



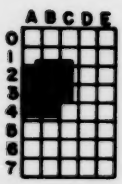
VEGETATION LAYERS	SOILS
TREE: small trees of low vigour; spacing open to quite dense. Pl	TERRAIN/PARENT MATERIALS: Rock outcrops; glaciofluvial outwash terraces, eskers.
SHRUB: low-lying, poorly to moderately developed. (Vaccinium membranaceum) (Salix scouleriana) (Amelanchier alnifolia) (Shepherdia canadensis) (Rosa acicularis)	SOIL NAME: Orthic Humo-Ferric Podzols with minor Eluviated Dystric Brunisols.
	TEXTURE: Loamy sand.
HERB: poorly to moderately well developed. Vaccinium caespitosum Arctostaphylos uva-ursi Melampyrum lineare Chimaphila umbellata Festuca occidentalis Oryzopsis asperifolia Oryzopsis pungens Hieracium albiflorum	DRAINAGE: Rapid.
	HUMUS FORM: Xeromors; Hemimors.
	EFFECTIVE ROOTING: Shallow on lithic sites; deep in glaciofluvial materials.
	OTHER FEATURES: Very thin organic horizons with little water-holding capacity.
MOSS: a mixture of mosses and lichens. Pleurozium schreberi Cladina spp. Peltigera spp. Cladonia spp. Stereocaulon spp. (Polytrichum juniperinum)	

COMMENTS: This association has a very limited distribution in the ICHgl and is unimportant for forest management.

PINE - LICHEN (1CHgl/02)

ACTIVITY OR CONCERN	
AVOID LOGGING	These ecosystems are submarginal for timber production. If they are included within larger openings, then consider their harvesting as timber mining.

DRY HEMLOCK - MOSS (ICHgl/03)



SLOPE POSITIONS: Upper slopes and ridge crests; some terraces and benches.

SLOPE RANGE: Level to moderately steep (0-45%).

ASPECT: All.

VEGETATION LAYERS	SOILS
TREE: canopy usually dense, formed by small, short trees. Hw (Pl) (Bl)	TERRAIN/PARENT MATERIALS: Morainal (colluvial) veneers over bedrock; some morainal blankets; coarse-textured glaciofluvial and fluvial deposits.
SHRUB: very poorly developed. (Vaccinium membranaceum) (Vaccinium ovalifolium) (Vaccinium alaskaense) (Menziesia ferruginea) (Paxistima myrsinites)	SOIL NAME: Orthic Humo-Ferric Podzols; Eluviated Dystric Brunisols.
HERB: very poorly developed. (Chimaphila umbellata) (Goodyera oblongifolia) (Cornus canadensis) (Orthilia secunda) (Rubus pedatus) (Linnaea borealis)	TEXTURE: Loam to loamy sand.
	DRAINAGE: Good.
	HUMUS FORM: Hemimors.
MOSS: a well-developed solid carpet of feathermosses. Pleurozium schreberi Hylocomium splendens (Ptilium crista-castrensis)	EFFECTIVE ROOTING: Variable, greater than 60 cm on glaciofluvial materials; on bedrock-controlled sites up to lithic contact.
	OTHER FEATURES: Organic materials generally weakly decomposed.

COMMENTS: Widespread throughout the ICHgl, especially at lower elevations. Productivity of trees lower than in the Zonal Hemlock - Moss e.a.

DRY HEMLOCK - MOSS (ICHg1/03)

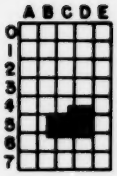
ACTIVITY OR CONCERN	
Species choice:	
Preferred	- Pl.
Acceptable	- (Sx). - a minor component of deciduous trees may improve site through litterfall and partial shading.
Logging:	- SIZE OF OPENING AND METHOD AND SEASON OF LOGGING CAN BE ADJUSTED TO PROMOTE NATURAL SEEDING WHERE APPROPRIATE.
Site preparation:	
Mechanical	- light mixing of humus with mineral soil may improve site.
Prescribed fire	- DO NOT BURN. - if humus is thicker than 15 cm consider a light burn to maintain or improve productivity. - coarse textured soil or shallow humus are particularly susceptible to degradation by fire.
Brush hazard	- very low to low. - deciduous trees occasionally may cause some problems.
Reforestation:	- plant Pl if required. - LOG TO PROMOTE Pl REGENERATION.
Other comments:	- where microclimatic extremes or difficulties in regeneration exist, and if stand structure permits, selective logging of merchantable stems may be preferred (assuming an acceptable residual stand).

DEVIL'S CLUB - OAK FERN - FEATHERMOSS (ICHg1/04)

SLOPE POSITIONS: Middle to lower slopes.

SLOPE RANGE: Gentle to moderately sloping.

ASPECT: All.



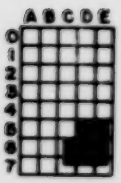
VEGETATION LAYERS	SOILS
TREE: stands relatively open; irregular canopies. Hw Bl Sx	TERRAIN/PARENT MATERIALS: Fluvial (glaciofluvial) deposits; morainal and colluvial blankets, often washed.
SHRUB: moderately well-developed. Oplopanax horridus Ribes lacustre Vaccinium ovalifolium Vaccinium membranaceum Menziesia ferruginea	SOIL NAME: Orthic and Gleyed Humo-Ferric Podzols.
	TEXTURE: Loam to sandy loam.
	DRAINAGE: Good to imperfect.
HERB: moderately to well-developed. Gymnocarpium dryopteris Tiarella spp. Cornus canadensis Rubus pedatus Orthilia secunda Clintonia uniflora (Streptopus spp.)	HUMUS FORM: Hemimors; Mormoders.
	EFFECTIVE ROOTING: Deep (greater than 60 cm).
MOSS: moderately well-developed feathermoss carpet. Hylocomium splendens Ptilium crista-castrensis Pleurozium schreberi (Rhytidiadelphus triquetrus)	OTHER FEATURES: Seepage often found at depth (greater than 40 cm below the mineral surface).

COMMENTS: Widespread, but less extensive and more localized than the Zonal Hemlock - Moss e.a. Subalpine fir and spruce are more important than in the Zonal Hemlock - Moss e.a.

DEVIL'S CLUB - OAK FERN - FEATHERMOSS (ICHg1/04)

ACTIVITY OR CONCERN	
Species choice:	
Preferred	- Sx.
Acceptable	- (Hw).
Logging:	- avoid deep gouging on finer textured soils to minimize seepage surfacing.
Site preparation:	
Mechanical	- AVOID, because disturbance may aggravate brush problem.
Prescribed fire	- OK EXCEPT ON SHALLOW SOILS. - when organic horizons are thicker than 15 cm, burning may improve site productivity. - unlikely to cause serious degradation.
Brush hazard:	- moderate; birch and/or aspen may be a problem. - ASSESS DURING FIRST SURVIVAL ASSESSMENT.
Reforestation	- PLANT IMMEDIATELY TO Sx.
Other comments:	- spruce weevil may cause serious damage and may require favouring species other than spruce.

DEVIL'S CLUB - FERN - LEAFY MOSS (10Hg1/05)



SLOPE POSITIONS: Lower to toe slopes, valley floors (depressions).

SLOPE RANGE: Flat to gently sloping (0-20%).

ASPECT: All.

VEGETATION LAYERS	SOILS
TREE: stands open; canopies irregular. Bl Sx (Hw)	TERRAIN/PARENT MATERIALS: Fluvial or washed morainal.
SHRUB: well-developed. Oplopanax horridus Ribes lacustre Vaccinium ovalifolium Cornus sericea Viburnum edule Rubus parviflorus	SOIL NAME: Orthic Gleysols.
HERB: well-developed, lush. Gymnocarpium dryopteris Dryopteris assimilis Athyrium filix-femina Tiarella spp. Streptopus spp.	TEXTURE: Silt loam.
MOSS: poorly developed. Mnium spp. Brachythecium spp.	DRAINAGE: Good to imperfect.
	HUMUS FORM: Mormoders; Hemihumimors.
	EFFECTIVE ROOTING: Shallow (less than 35 cm).
	OTHER FEATURES: All soils relatively rich, and very moist to wet for most of the growing season.

COMMENTS: A very productive e.a. for spruce and subalpine fir. Such ecosystems are common in the 10Hg1, but stands are rarely of large extent. The predominance of spruce and subalpine fir and heavy cover of Oplopanax horridus distinguish this association from the less rich Devil's Club - Oak Fern - Feathermoss e.a.

DEVIL'S CLUB - FERN - LEAFY MOSS (ICHgl/05)

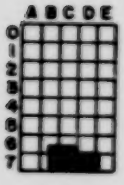
ACTIVITY OR CONCERN	
Species choice:	
Preferred	- Sx.
Acceptable	- Pl, (Hw).
Logging:	- WINTER LOG IN ORDER TO MINIMIZE DISTURBANCE.
Site preparation:	
Mechanical	- AVOID, because of fine soil textures, wetness of site, and brush hazard.
Prescribed fire	- preferred for planter access but often difficult to obtain an acceptable burn due to wetness of site and rapid brushing-in.
Brush hazard	- moderate to severe; depends on abundance in stand before logging and degree of disturbance - birch occasionally pose a severe problem.
Reforestation:	- PLANT IMMEDIATELY WITH Sx, especially on high spots.
Other comments:	- ASSESS NEED AND URGENCY OF BRUSHING AND WEEDING AT TIME OF PLANTING. - spruce weevil may attack spruce. - PLAN ALL TREATMENTS NECESSARY TO ENSURE ESTABLISHMENT, since timing is critical if brush is to be controlled.

HORSETAIL - (SKUNK CABBAGE) SWAMP (ICHg1/06)

SLOPE POSITION: Depressions on valley floors or slope benches.

SLOPE RANGE: Level.

ASPECT: Flat.



VEGETATION LAYERS	SOILS
TREE: stocking irregular, many stand openings. Bl Sx (Hw)	TERRAIN/PARENT MATERIALS: Organic veneers over fluvial, lacustrine, or marginal deposits.
SHRUB: cover variable, well-developed in openings. Alnus incana ssp. tenuifolia Lonicera involucrata Viburnum edule Cornus sericea	SOIL NAME: Orthic Gleysols; Terric Mesisols.
	TEXTURE: Organic to clay loams.
	DRAINAGE: Poor.
HERB: well-developed. Equisetum arvense Equisetum pratense Equisetum sylvaticum Lysichiton americanum Athyrium filix-femina Gymnocarpium dryopteris Tiarella spp.	HUMUS FORM: Histomors; Hydromors.
	EFFECTIVE ROOTING: Shallow, 10-20 cm.
MOSS: variable but generally well-developed. Hylocomium splendens Mnium spp. (Sphagnum spp.)	OTHER FEATURES: Thick, wet organic layers cover the soil surface.

COMMENTS: This e.a. is found throughout the ICHg1 at low elevations, but is localized in small pockets. Tree growth is restricted because of the high water table and poor soil aeration.

HORSETAIL - (SKUNK CABBAGE) SWAMP (ICHgl/06)

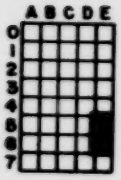
ACTIVITY OR CONCERN	
Species choice:	
Preferred	- Sx.
Acceptable	- (Bl).
Logging:	- WINTER LOG OR DURING DRIEST PARTS OF SUMMER. - DO NOT DESTROY MOUNDS. - AVOID LOGGING POORER EXAMPLES OF THESE UNITS. - selective logging may be a viable alternative.
Site preparation:	
Mechanical	- AVOID.
Prescribed fire	- AVOID, it will reduce organic horizons. - consider planting chance before prescribing fire. - difficult to do a good job but could be used for species conversion.
Brush hazard:	- variable depending on drainage and richness of site. - control usually not required because of the open stand structure.
Regeneration:	- FILL-PLANT WITH Sx (MOUNDS ONLY).
Other comments:	- because of difficulty in fully realizing potential productivity of this unit (patchy stocking), all coniferous regeneration should be accepted.

FLOODPLAIN COTTONWOOD SERAL (ICHgl/07)

SLOPE POSITIONS: Valley floors.

SLOPE RANGE: Level (0-2%).

ASPECT: Flat.



VEGETATION LAYERS	SOILS
TREE: very large, open grown trees. Act (Sx) (Bl)	TERRAIN/PARENT MATERIAL: Active fluvial (alluvial) sediments.
SHRUB: well-developed, very tall. Cornus sericea Alnus viridis ssp. sinuata Alnus incana ssp. tenuifolia Salix spp. Viburnum edule Lonicera involucrata Rosa acicularis Rosa nutkana	SOIL NAME: Cumulic and Orthic Regosols. TEXTURE: Variable. DRAINAGE: Good to rapid.
HERB: well-developed. Equisetum arvense Equisetum pratense Equisetum hyemale Gallium triflorum Pyrola asarifolia Circaea alpina Athyrium filix-femina Smilacina racemosa	HUMUS FORM: Absent or thin Velomoders. EFFECTIVE ROOTING: Deep, greater than 60 cm. OTHER FEATURES: Very thin surface organic matter accumulations.
MOSS: very poorly developed, generally absent except on decaying wood and tree bases.	

COMMENTS: This e.a. is common on floodplain islands and river bottomlands of the Nass, Skeena, and Kispiox rivers and a few of their major tributaries. These are very productive ecosystems, but coniferous trees are slow to establish after disturbance because of the intense competition from shrubs and herbs.

FLOODPLAIN - COTTONWOOD SERAL (ICHgl/07)

ACTIVITY OR CONCERN	
Species choice: Preferred Acceptable	 - Sx. - Act, (At).
Logging:	- winter logging preferred.
Site preparation:	
Mechanical	- AVOID IF POSSIBLE. - consider only if a committed program of brush control is in place.
Prescribed fire	- OK but difficult because of poor distribution of slash and rapid brushing in, therefore timing is important.
Brush hazard:	- SEVERE (sometimes variable). - CONTROL REQUIRED, search for a cost-efficient method to re-establish a coniferous stand.
Reforestation:	- PLANT Sx IMMEDIATELY, preferably with large plug stock.
Other comments:	- PLAN ALL TREATMENTS NECESSARY TO ENSURE "FREE GROWING" CONIFERS; timing is critical if brush is to be controlled. - search for appropriate herbicides.

5 THE ICHgla PHASE

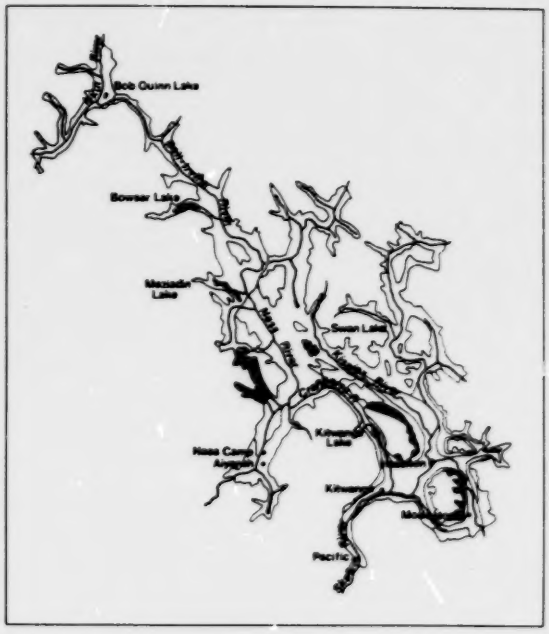


FIGURE 9. The Northwestern Transitional Interior Cedar - Hemlock Subzone, Upper Nass Basin Variant, Amabilis Fir Phase (ICHgla) in the Prince Rupert Forest Region.

5.1 Ecosystem Units of the ICHgla

/01 Zonal Hemlock - Amabilis Fir - (Vaccinium) - Moss ecosystem association
/02 Dry Hemlock - Moss ecosystem association
/03 Devil's Club - Oak Fern ecosystem association
/04 Devil's Club - Lady Fern - Oak Fern ecosystem association

5.2 Seral Variations - ICHgla

Successional stands are of very minor importance in this phase of the ICHgl Variant. Most stands are mature and overmature western hemlock forests. Where they do occur they are similar to those described for the ICHgl in general.

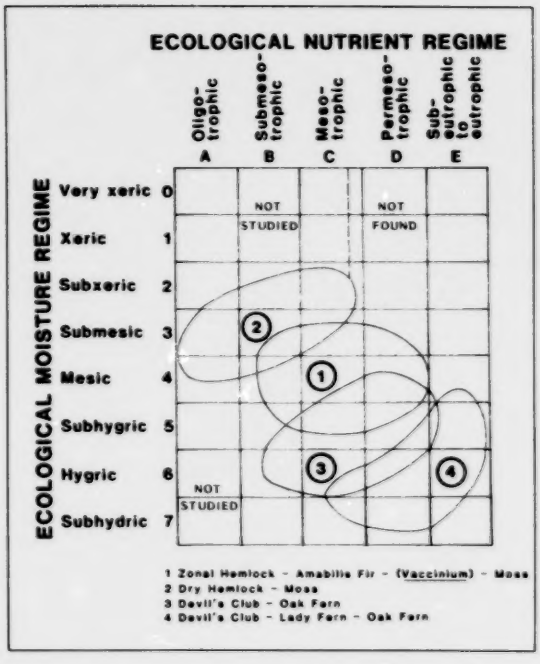


FIGURE 10. Edatopic grid of the IDFgla.

5.3 Key to Ecosystem Units of the ICHgla

A Ecosystems with Hw and Ba the main canopy components ..... B

AA Ecosystems with Ba and Bl the main canopy components; Hw common in the sub-canopy layers

DEVIL'S CLUB - LADY FERN - OAK FERN (ICHgla/04)

B Shrub layers with abundant advanced regeneration; generally middle or upper slope positions C

C Moss layer dominated by Hylocomium splendens; Sx often present

ZONAL HEMLOCK - AMABILIS FIR - (VACCINIUM) - MOSS (ICHgla/01)

CC Moss layer dominated by Pleurozium schreberi; Sx rare or lacking

DRY HEMLOCK - MOSS (ICHgla/02)

BB Shrub layers with little advanced regeneration; generally lower slopes receiving temporary seepage..... D

DEVIL'S CLUB - OAK FERN (ICHgla/03)

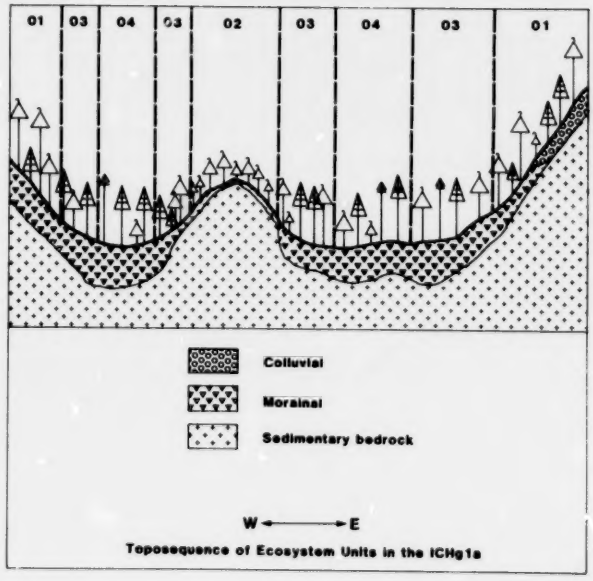


FIGURE 11. Toposequences of ecosystems in the ICHgla. Tree symbols as in Appendix 11.2.

TABLE 5. Habitat features of ecosystem units in the ICHgla

Habitat features	02	01	03	04
Slope class	level to very steep	gentle to steep	level to steep	level to mod. sloping
Slope positions	upper, ridges	middle	middle, lower	lower, valleys
Soil parent materials[1]	C,M	C,M	M,C,F	F,C,M
Soil texture[2]	LS,SL	L,LS	LS,SL	SiL,L
Drainage class	well	well	well	imperfect, poor
Moisture regime	submesic	mesic	subhygric	hygric
Nutrient regime	submeso-trophic	meso-trophic	permeso-trophic	eutrophic
Soil classification[3]	HFP, R	HFP, FHP	HFP, FHP	G
Humus form classification[4]	HMR	HMR	HMR	MMR, HMR
Rooting depth (cm)	<70	--	--	<40
Thickness humus layer (cm)	<15	>20	4-6	7-18
Mineral soil pH (mean)	4.3	4.6	4.5	--
Humus pH (mean)	3.2	2.9	4.3	--

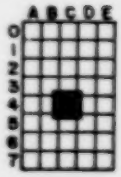
[1] Abbreviations of soil parent materials: C - colluvial; F - fluvial; M - morainal.
[2] Abbreviations of soil textures: L - loam; LS - loamy sand; SL - sandy loam; SiL - silt loam.
[3] Abbreviations of soil orders/great groups: FHP - Ferro-Humic Podzols; G - Gleysols; HFP - Humo-Ferric Podzols; R - Regosols.
[4] Abbreviations of humus form classification: HMR - Hemimors; HMR - Hemihumimors; MMR - Mormoders.

TABLE 6. Summary of silvicultural prescriptions and guidelines for the ICHgla

Ecosystem unit	Species choice		Primary method of establishment	Site preparation		Brush potential
	Preferred	Acceptable		Mech.	Burning	
/01	Sx	Hw, Pl, (Ba)	Natural	AVOID	(OK)	Low
/02	Pl	(Hw), (Sx)	Planting	AVOID	AVOID	Very low
/03	Sx	Hw, Ba, (Cw)	Natural	AVOID	OK	Moderate to severe
/04	Sx	Ba, Cw, (Hw)	Planting	AVOID	OK	Severe

5.4 Description and Interpretation of Ecosystem Units of the IDHgla

ZONAL HEMLOCK - AMABILIS FIR - (VACCINIUM) - MOSS (IDHgla/UL)



SLOPE POSITIONS: Mid-slopes.

SLOPE RANGE: Gentle to steep (10-70%).

ASPECT: All.

VEGETATION LAYERS[1]	SOILS
TREE: stands mostly overmature, all-aged. Hw Ba	TERRAIN/PARENT MATERIALS: Chiefly colluvial blankets; some morainal blankets.
SHRUB: poorly to well-developed; abundant advanced regeneration. Vaccinium ovalifolium Vaccinium membranaceum Menziesia ferruginea (Vaccinium alaskaense)	SOIL NAME: Humo-Ferric and Ferro-Humic Podzols.
HERB: poorly to moderately well-developed. Rubus pedatus Cornus canadensis Streptopus streptopoides Orthilia secunda Moneses uniflora	TEXTURE: Loam to loamy sand.
MOSS: a well-developed carpet. Hylocomium splendens Pleurozium schreberi Ptilium crista-castrensis Rhytidiopsis robusta (Rhytidiadelphus loreus)	DRAINAGE: Good.
	HUMUS FORM: Hemimors.
	EFFECTIVE ROOTING: Deep (greater than 60 cm).
	OTHER FEATURES: The coarse fragment content of these soils is high.

COMMENTS: This e.a. is widespread through the IDHgla, covering the major portion of the mountain slopes. This association is the climatic climax of the IDHgla, and is similar to climatic climax ecosystems found at montane elevations in the adjacent CWHf Subzone to the west of the IDHgla.

[1] Parentheses indicate species that may have low cover or may not be consistently present.

ZONAL HEMLOCK - AMABILIS FIR (VACCINIUM) - MOSS (ICHgla/01)

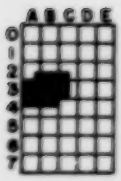
ACTIVITY OR CONCERN	
Species choice:	
Preferred	- Sx.
Acceptable	- Hw, Pl. - Ba; only on moister and richer examples of these units.
Logging:	- AVOID UNNECESSARY DISTURBANCE.
Site preparation:	
Mechanical	- AVOID TO PROTECT ACCEPTABLE ADVANCED REGENERATION. - usually not necessary.
Prescribed fire	- OK; planting required if burned.
Brush hazard:	- low (occasionally moderate). - Vaccinium may pose a problem to planters and initial growth of trees. - ASSESS NEED OF CONTROL AT TIME OF REGENERATION SURVEY.
Reforestation:	- IF REQUIRED FILL-PLANT WITH Sx OR Hw. - If burned, planting required but should be delayed several seasons to improve survival.
Other comments:	- Ba may slow down on drier, poorer, colder examples of this unit. - Subsequent spacing control is usually required.

DRY HEMLOCK - MOSS (ICHgla/02)

SLOPE POSITIONS: Upper slopes and spurs, ridge crests.

SLOPE RANGE: Level to very steep (0-70%+).

ASPECT: All.



VEGETATION LAYERS	SOILS
TREE: trees smaller than in zonal ecosystems. Pw (Ba)	TERRAIN/PARENT MATERIALS: Colluvial or morainal veneers over bedrock; occasionally coarse-textured glaciofluvial deposits.
SHRUB: poorly developed; dominantly coniferous regeneration. (Vaccinium membranaceum) (Menziesia ferruginea) (Vaccinium ovalifolium)	SOIL NAME: Orthic Humo-Ferric Podzols; Orthic Regosols.
HERB: poorly developed. (Cornus canadensis) (Orthilia secunda) (Streptopus streptopoides) (Rubus pedatus)	TEXTURE: Sandy loam to loamy sand.
MOSS: well-developed feather-moss carpet. Pleurozium schreberi Hylocomium splendens Ptilium crista-castrensis Rhytidiopsis robusta	DRAINAGE: Good to rapid.
	HUMUS FORM: Mesomors.
	EFFECTIVE ROOTING: Relatively deep (up to 70 cm).
	OTHER FEATURES: High coarse fragment content.

COMMENTS: The ICHgla/02 is found only on extreme sites in the ICHgla, generally in locations exposed to above-average sunlight and rapid drainage. This e.a. can be distinguished from the ICHgla/01 by the lack of a shrub layer and predominance of the moss, Pleurozium schreberi.

GREY HEMLOCK - MOSS (ICHgla/02)

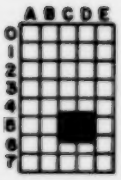
ACTIVITY OF CONCERN	
Species choice: Preferred Acceptable	- Pl. - (Hw), (Sx). - a minor component of aspen or birch may improve the site by promoting decomposition and incorporation of litter into soil.
Logging:	- 3-m knockdown to eliminate shade-tolerant-remnants of the understory. - AVOID EXCESSIVE GROUND DISTURBANCE.
Site preparation:	
Mechanical	- AVOID, particularly on steep slopes or shallow soil.
Prescribed fire	- DO NOT BURN. - if advanced regeneration is unacceptable and/or if organic horizons are thicker than 15 cm, consider a light burn (spring) to consume only the L horizon.
Brush hazard:	- very low.
Reforestation:	- PLANT WITH Pl.
Other comments:	- Ba, Cw, Hw, Sx unacceptable. - organic horizons are very beneficial for moisture retention.

DEVIL'S CLUB - OAK FERN (ICHgla/03)

SLOPE POSITIONS: Middle to lower slopes.

SLOPE RANGE: Level to steep.

ASPECT: All.



VEGETATION LAYERS	SOILS
TREE: all species growing well. Pw Ba (Sx) SHRUB: moderately to well-developed. Oplopanax horridus Vaccinium ovalifolium Rubes lacustre HERB: moderately developed; moderate species diversity. Gymnocarpium dryopteris Tiarella spp. Streptopus spp. Cornus canadensis Rubus pedatus MOSS: moderately developed carpet of feathermosses; leafy mosses in depressions. Hylocomium splendens Ptilium crista-castrensis Pleurozium schreberi Mnium spp.	TERRAIN/PARENT MATERIALS: Morainal and colluvial blankets; fluvial deposits. SOIL NAME: Orthic and Gleyed Humo-Ferric Podzols. TEXTURE: Loamy sand to sandy loam. DRAINAGE: Good to imperfect. HUMUS FORM: Hemimors. OTHER FEATURES: Mottling may occur in the lower soil horizons. Coarse fragment content generally greater than 40%.

COMMENTS: This e.a. is found throughout the ICHgla, and represents productive ecosystems for hemlock, amabilis fir, and spruce. Spruce is normally the largest tree in the stand.

DEVIL'S CLUB - OAK FERN (ICHgla/03)

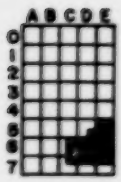
ACTIVITY OR CONCERN	
Species choice:	
Preferred	- Sx.
Acceptable	- Hw, Ba, (Cw).
Logging:	- MINIMIZE SLASH PRODUCTION. - this unit often exists in complex with ICHgla/01 as hollows that typically collect slash. - MINIMIZE DISTURBANCE. - logging during wetter seasons increases site disturbance and brush encroachment. - 3-m knockdown.
Site preparation:	
Mechanical	- AVOID.
Prescribed fire	- OK, EXCEPT ON SHALLOW SOILS. - often unnecessary due to complexing with ICHgla/01.
Brush hazard:	- moderate to severe; depends on mature stand structure and amount of disturbance.
Reforestation:	- UTILIZE ACCEPTABLE Hw and Ba. - IF PLANTING IS REQUIRED DO SO IMMEDIATELY WITH Sx OR (Cw).
Other comments:	- assess need of brushing and weeding at time of first silvicultural survey.

DEVIL'S CLUB - LADY FERN - OAK FERN (ICHgla/OA)

SLOPE POSITIONS: Valley floors, lower and toe slopes.

SLOPE RANGE: Level to moderately sloping (0-25%).

ASPECT: All.



VEGETATION LAYERS	SOILS
TREE: trees large, widely spaced. Sa Bl Hw Cw	TERRAIN/PARENT MATERIALS: Fluvial; colluvial and morainal deposits.
SHRUB: well-developed, tall. Oplopanax horridus Ribes lacustre (Vaccinium spp.) (Menziesia ferruginea) (Rubus spectabilis) (Sambucus racemosa)	SOIL NAME: Orthic Gleysols and Gleyed subgroups of Brunisols, Regosols, and Podzols.
	TEXTURE: Silt loam to loam.
	DRAINAGE: Imperfect to poor.
HERB: well-developed and diverse. Athyrium filix-femina Gymnocarpium dryopteris Dryopteris assimilis Tiarella spp. Streptopus spp.	HUMUS FORM: Mormoders; Hemihumimors.
	EFFECTIVE ROOTING: Shallow (less than 40 cm).
MOSS: dominated by leafy mosses and liverworts. Mnium spp. Brachythecium spp. (Barbilophozia spp.)	OTHER FEATURES: Seepage commonly found within 40 cm of the soil surface.

COMMENTS: This e.a. is found on permanent seepage sites throughout the ICHgla but always in small pockets. It represents the most productive ecosystems in the ICHgla. Small patches develop wherever drainage channels or depressions occur.

DEVIL'S CLUB - LADY FERN - OAK FERN (ICHgla/04)

ACTIVITY OR CONCERN	
Species choice: Preferred Acceptable	 - Sx. - Ba, Cw. - Hw acceptable on humus mounds.
Logging:	- try to lay out these units as separate areas to facilitate speed and control of subsequent treatments. - avoid these ecosystems for road building and skid trails. - LOG DURING WINTER OR DRIER TIMES OF YEAR TO MINIMIZE DISTURBANCE.
Site preparation:	
Mechanical	- AVOID, because of fine soil textures, wetness, and brush hazard.
Prescribed fire	- RECOMMENDED, EXCEPT ON FRAGMENTAL OR SKELETAL SOILS. - often difficult to get a good burn due to wetness and brush.
Brush hazard:	- SEVERE; ASSESS NEED AND URGENCY OF CONTROL AT TIME OF PLANTING.
Reforestation:	- PLANT IMMEDIATELY WITH HEALTHY, STURDY STOCK (Sx). - plant on high spots if areas are wet.
Other comments:	- these units must be planned in detail and closely controlled to avoid brush problems and site degradation. TIMING IS CRITICAL. Winter logging followed by a spring burn will save a season. Frequent monitoring of plantation progress is necessary.

6 THE ICHg2 VARIANT

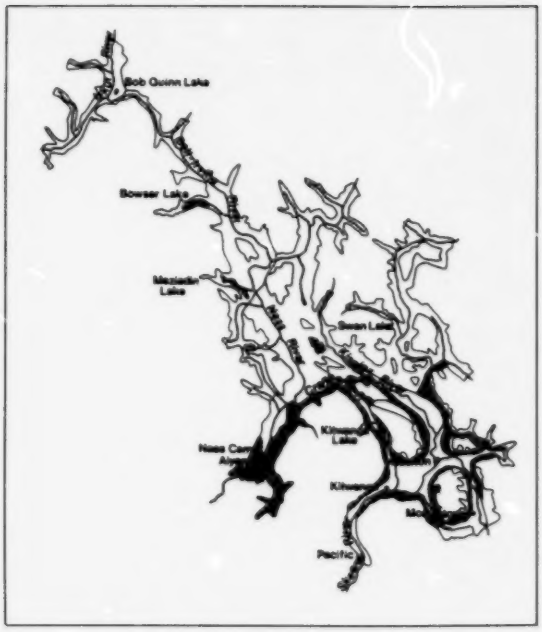


FIGURE 12. The Northwestern Transitional Interior Cedar - Hemlock Subzone, Lower Nass Basin Variant (ICHg2) in the Prince Rupert Forest Region.

6.1 Ecosystem Units of the ICHg2

/01 Zonal Hemlock - (Cedar) - Moss ecosystem association
/02 Pine - Lichen ecosystem association
/03 Dry Hemlock - Moss ecosystem association
/04 Devil's Club - Oak Fern - Feathermoss ecosystem association
/05 Devil's Club - Fern - Leafy Moss ecosystem association
/06 Horsetail Swamp ecosystem association
Seral ecosystem association:
/07 Floodplain Cottonwood Seral ecosystem association

6.2 Seral Variations - ICHg2

No detailed descriptions of seral variations for any of the ecosystem associations in the ICHg2 have been completed. Seral or successional stands are widespread at low elevations in the Nass Valley portion of the ICHg2. They are also present, but less common, in the Skeena-Bulkley Valley.

Many seral stands already bear a strong resemblance to the climax stand into which they will eventually develop. Such stands are easily assigned to one of the ecosystem associations described on the following pages. Management interpretations for the ecosystem unit should also apply well to these stands. Note, however, that the brush hazard of these sites is often significantly increased because of the presence of deciduous tree species and seral shrubs. Abundant advance regeneration of subalpine fir may also be present and may create regeneration problems after logging.

In the ICHg2, particularly near its border with the ICHg3, seral stands are encountered that give little indication of the kind of climax forest into which they will evolve. These are primarily stands with a heavy component of trembling aspen or paper birch in the overstory. They typically have very dense shrub and herb layers, dominated by species like

Cornus sericea, Rubus parviflorus, Corylus cornuta, Lathyrus nevadensis, Aralia nudicaulis, Smilacina stellata, and various species of grass. There is little or no moss layer. When you encounter a stand like this in the field, please refer to an appropriate seral ecosystem association description for the ICHg3 Variant, and follow the management guidelines for that unit.

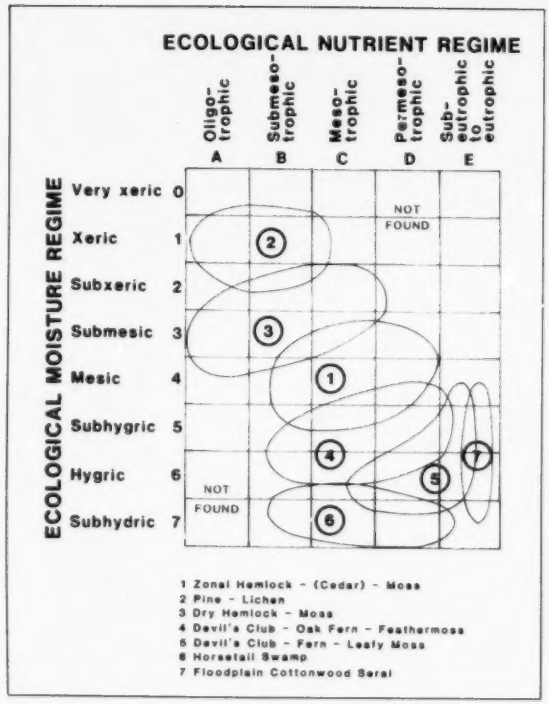


FIGURE 13. Edatopic grid of the ICHg2.

6.3 Key to Ecosystem Units of the ICHg2

A Ecosystems with moderate to poor tree growth ..... B

AA Ecosystems with good tree growth ..... G

B Equisetum spp. dominate herb layer

HORSETAIL SWAMP (ICHg2/06)

BB Equisetum spp. rare or lacking in herb layer C

C Pl dominates main canopy; upper slopes and ridge crests or dry terraces ..... D

D Moss layer dominated by lichens

PINE - LICHEN (ICHg2/02)

DD Moss layer a solid carpet of feathermosses

DRY HEMLOCK - MOSS (ICHg2/03)

CC Hw dominates main canopy; generally middle slope positions ..... E

E Moderately dense stands of small to medium - sized trees; Sx often present; herb layer poorly to moderately developed

ZONAL HEMLOCK - (CEDAR) - MOSS (ICHg2/01)

EE Dense canopy of small short trees; Sx rare or lacking; herb layer very poorly developed

DRY HEMLOCK - MOSS (ICHg2/03)

G Act dominates main canopy; floodplain islands and river bottomlands

FLOODPLAIN COTTONWOOD SERAL (ICHg2/07)

GG Act rare or lacking in main canopy; generally lower slope positions ..... H

H Herb layer dominated by ferns (Gymnocarpium, Dryopteris, and Athyrium); feathermosses confined to hummocks and decaying wood

DEVIL'S CLUB - FERN - LEAFY MOSS (ICHg2/05)

HH Athyrium and Dryopteris spp. rare or lacking; well-developed feathermoss carpet

DEVIL'S CLUB - OAK FERN - FEATHERMOSS (ICHg2/04)

6.4 Prominence of the Major Species of the ICHg2

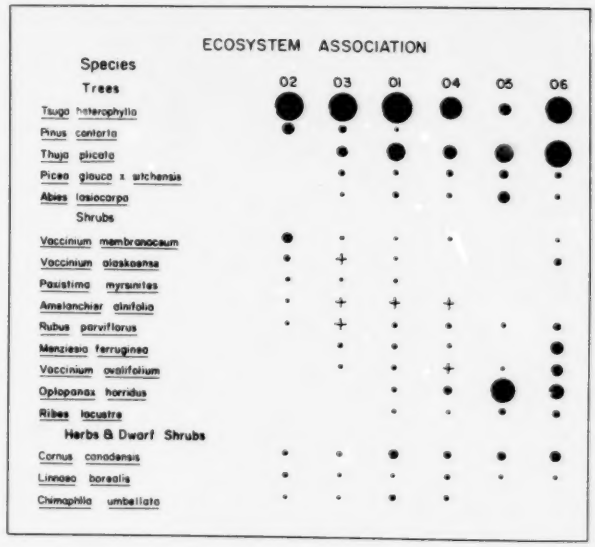


FIGURE 14. Prominence values for the major species of the ICHg2. Diameters of the circles are proportional to the prominance value, which is a measure of plant abundance incorporating both frequency and cover of the species in our sample plots. Prominance value = mean cover multiplied by the square root of freqency. + = trace.

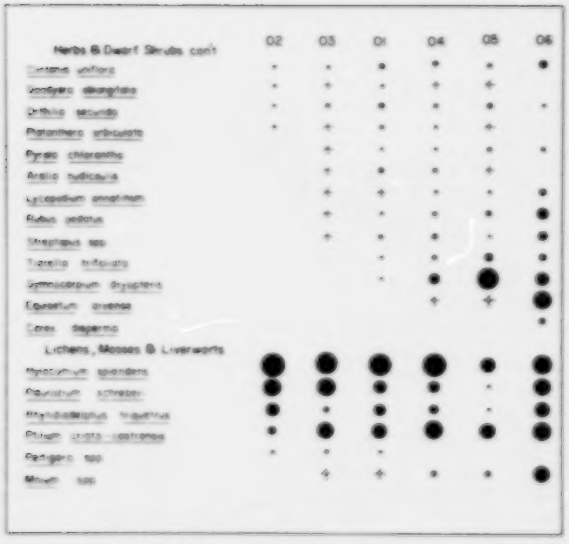


FIGURE 24. (cont'd)

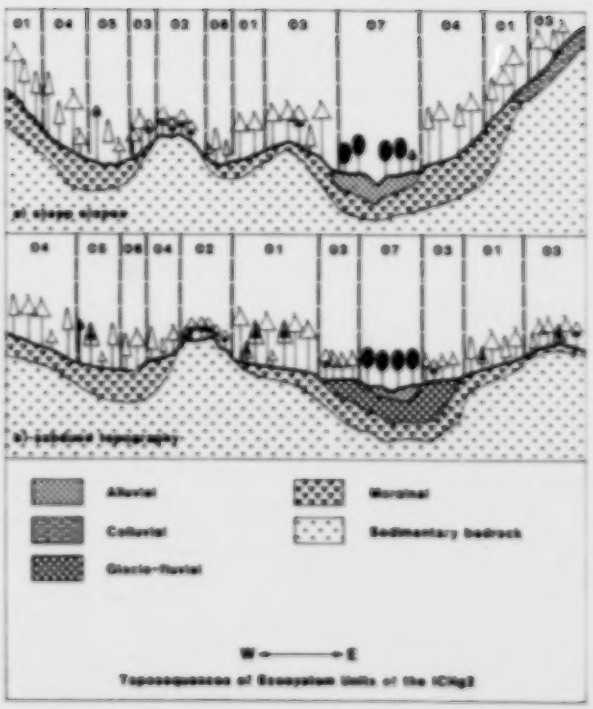


FIGURE 15. Toposequences of ecosystems in the ICHg2. Tree symbols as in Appendix II.2.

TABLE 7. Habitat features of ecosystem units in the IIPNG[1]

Habitat features	I2	I3	I5	I6	I7	I8	I7
Slope class	level to mod. sloping	level to very sloped	gentle to mod. sloping	level to mod. steep	gently sloping to level	gently sloping to level	level
Slope positions	ridge across	ridge, ridges	ridges	lower, valleys	lower, valleys	valley floors, depressions	valley floors
Soil parent materials[2]	Al, Fl	A, I, Fl	C, I	A, C	Al, F	A	F
Soil textures[2]	L1	L, SL	SL, L	SL, L	SL, L	SL, Al	variable
Drainage class	rapid	well	mod. well	well, imperfect	well, imperfect	poor	well, rapid
Moisture regime	aquic	aquic	aquic	subaquic	tuptic	subaquic	subaquic, tuptic
Nutrient regime	subeutrophic	subeutrophic	mesotrophic	permeutrophic	eutrophic	permeutrophic	permeutrophic, eutrophic
Soil classification[3]	dTF	dTF	SL	SL, dTF	L, ES	L, M	M
Human form classification[4]	HAB	HAB	HAB	HAB, HAB	HAB, HAB	HAB, HAB,	Grass, HAB
Rooting depth (cm)	>60	—	<30	>60	>60	>30	>60
Thickness human layer (cm)	0-5	0-15	0-10	0-10	>10	>30	<5
Kilogram soil pH (mean)	6.5	6.7	5.1	6.0	6.2	5.9	6.5
Human pH (mean)	5.7	6.2	5.8	5.7	5.2	4.8	6.1

[1] Abbreviations of soil parent materials: C = colluvial; F = fluvial; Fl = glaciofluvial; M = marginal; O = organic; Pl = non colluvial.
[2] Abbreviations of soil textures: CL = clay loam; L = loam; LS = loamy sand; SL = sandy loam; SiL = silt loam.
[3] Abbreviations of soil orders/great groups: ES = Eutric Tropaquepts; S = Tropaquepts; SL = Gley Luvisols; dTF = Humoferrans Tropepts; M = Mesepts; O = Tropepts.
[4] Abbreviations of human form classification: HAB = Habitations; HAB = Habitations; HIP = Hutmakers; HAB = Horticulture.

TABLE 8. Summary of silvicultural prescription and guidelines for the ICHg2

Ecosystem unit	Species choice		Primary method of establishment	Site preparation		Brush potential
	Preferred	Acceptable		Mech.	Burning	
/01	Sx	Pl,(Hw),(Cw)	Planting	AVOID	OK	Low
/02	A V O I D	L O G G I N G				
/03	Pl	(Sx), (At)	Natural	AVOID	AVOID	Low
/04	Sx, (Cw)	Hw, Pl, Cw (Bm)	Planting	AVOID	OK	Moderate
/05	Sx, Cw	Hw, (Bm)	Planting	AVOID	OK	Severe
/06	Sx, Cw	(Hw)	Natural	AVOID	AVOID	Variable
/07	Sx	Act, (At)	Planting	AVOID	OK	Severe

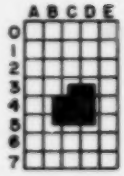
6.3 Description and Interpretation of Ecosystem Units of the ICHg2

ZONAL HEMLOCK - (CEDAR) - MOSS (ICHg2/01)

SLOPE POSITIONS: Middle (generally).

SLOPE RANGE: Gentle to moderately sloping.

ASPECT: All.



VEGETATION LAYERS[1]	SOILS
TREE: Hw Cw (Pl) (Sx) (Bl)	TERRAIN/PARENT MATERIALS: Morainal and colluvial blankets. SOIL NAME: Brunisolic and Podzolic Gray Luvisols.
SHRUB: very poorly developed; frequently absent. Vaccinium membranaceum Menziesia ferruginea Paxistima myrsinites	TEXTURE: Sandy loam to silt loams.
HERB: poorly to moderately well-developed. Chimaphila umbellata Cornus canadensis Orthilia secunda Clintonia uniflora Goodyera oblongifolia Aralia nudicaulis	DRAINAGE: Moderately good. HUMUS FORM: Hemimors. EFFECTIVE ROOTING: Shallow (less than 25 cm).
MOSS: well-developed except where heavy cover of Cw. Hylocomium splendens Ptilium crista-castrensis Rhytidiadelphus triquetrus Pleurozium schreberi	OTHER FEATURES: Compact, fine-textured subsurface horizons are common and can become impenetrable to tree roots.

COMMENTS: This e.a. is common and widely distributed throughout the ICHg2. Advanced regeneration of cedar and hemlock is common in the shrub layer.

[1] Parentheses indicate species that may have low cover or may not be consistently present.

ZONAL HEMLOCK - (CEDAR) - MOSS (ICHG2/01)

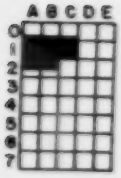
ACTIVITY OR CONCERN	
Species choice:	
Preferred	- Sx.
Acceptable	- Pl. - Hw becomes acceptable at higher elevations and on northern aspects. - Cw acceptable only on moister, richer examples of this unit.
Logging:	- winter or summer. - protect acceptable advanced regeneration by minimizing disturbance. - S-W knockdown to minimize mistletoe.
Site preparation:	
Mechanical	- AVOID.
Prescribed fire	- OK on deep humus (thicker than 15 cm), but avoid on steep slopes or sites with shallow humus. - light burn may be desired to eliminate unacceptable advanced regeneration.
Brush hazard:	- low, increases with disturbance. - assess need of treatment during survival examination. - when Vaccinium species dominate, planter access and seedling establishment will be hampered.
Reforestation:	- PLANT Sx OR Pl.
Other comments:	- establishment of spruce may be hindered by Pineus aphid.

PINE - LICHEN (ICHg2/01)

SLOPE POSITIONS: Slope apices and ridge crests, terraces.

SLOPE RANGE: Level to moderately sloping (0-25%).

ASPECT: All.



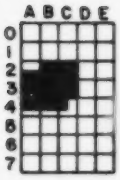
VEGETATION LAYERS	SOILS
TREE: trees small, of low vigour; stands open to quite dense. Pl	TERRAIN/PARENT MATERIALS: Rock outcrops; glaciofluvial outwash terraces, eskers.
SHRUB: low-lying, poorly to moderately developed. Vaccinium membranaceum (Salix scouleriana) (Amelanchier alnifolia) (Shepherdia canadensis) (Rosa acicularis)	SOIL NAME: Humo-Ferric Podzols with minor Eluviated Dystric Brunisols.
	TEXTURE: Loamy sand.
HERB: poorly to moderately well-developed. Arctostaphylus uva-ursi Melampyrum lineare Chimaphila umbellata Festuca occidentalis Oryzopsis asperifolia Oryzopsis pungens Hieracium albiflorum	DRAINAGE: Rapid.
	HUMUS FORM: Mesomors; Hemimors.
	EFFECTIVE ROOTING: Shallow on lithic sites; deep in glaciofluvial deposits.
MOSS: a mixture of mosses and lichens. Pleurozium schreberi Cladina spp. Peltigera spp. Cladonia spp. Stereocaulon spp. (Polytrichum juniperinum)	OTHER FEATURES: Very thin organic horizons with little water-holding capacity.

COMMENTS: This e.a. has a very limited distribution in the ICHg2 and is unimportant for forest management.

PINE - LICHEN (ICHg2/02)

ACTIVITY OR CONCERN	
AVOID LOGGING	These ecosystems are submarginal for timber production. If they are included within larger openings, then consider their harvesting as timber mining.

DRY HEMLOCK - MOSS (ICHg2/05)



SLOPE POSITIONS: Upper slopes and ridge crests.

SLOPE RANGE: Level to very steep (0-75%+).

ASPECT: All.

VEGETATION LAYERS	SOILS
TREE: trees typically small; stands densely stocked. Hw Pl (Bl) (Cw)	TERRAIN/PARENT MATERIALS: Morainal and colluvial veneers and blankets; coarse-textured glaciofluvial deposits (kames).
SHRUB: very poorly developed. (Vaccinium membranaceum) (Menziesia ferruginea) (Amelanchier alnifolia) (Acer glabrum)	SOIL NAME: Humo-Ferric Podzols; minor Eluviated Dystric Brunisols.
	TEXTURE: Loam to sandy loam.
	DRAINAGE: Good.
HERB: very poorly developed. (Cornus canadensis) (Chimaphila umbellata) (Orthilia secunda) (Pyrola chlorantha) (Linnaea borealis) (Goodyera oblongifolia) (Platanthera orbiculata)	HUMUS FORM: Hemimors.
	EFFECTIVE ROOTING: Variable, but usually greater than 60 cm.
MOSS: generally a well-developed, solid carpet of feathermosses. Hylocomium splendens Pleurozium schreberi Ptilium crista-castrensis Rhytidiadelphus triquetrus	OTHER FEATURES: Generally high coarse fragment content; moisture deficits common during the growing season.

COMMENTS: The coarse soils and moisture-shedding slope positions create dry, nutrient-poor site conditions. Tree growth is generally poor. The understory species diversity and vigour of this e.a. are poorer than in the Zonal Hemlock - Moss e.a. (ICHg2/01), and stocking typically is denser.

DRY HEMLOCK - MOSS (ICHg2/03)

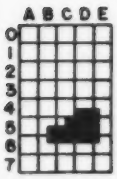
ACTIVITY OR CONCERN	
Species choice:	
Preferred	- Pl.
Acceptable	- (Sx). - minor component of aspen for site improvement. - use only local provenances due to variable serotiny in Pl cones.
Logging:	- ADJUST TO PROMOTE Pl REGENERATION.
Site preparation:	
Mechanical	- AVOID.
Prescribed fire	- DO NOT BURN, as organic horizons are very beneficial. - a light burn (spring) is acceptable if only L horizon is consumed.
Brush hazard:	- low.
Reforestation:	- if required, plant Pl.
Other comments:	- adjustments should be made to promote natural seeding-in of Pl.

DEVIL'S CLUB - OAK FERN - FEATHERMOSS (ICHg2/04)

SLOPE POSITIONS: Lower, valley floors.

SLOPE RANGE: Level to moderately steep.

ASPECT: All.



VEGETATION LAYERS	SOILS
TREE: Hw Cw (Sx) (Bl)	TERRAIN/PARENT MATERIALS: Morainal blankets; colluvial over morainal blankets; some fluvial deposits.
SHRUB: moderately well-developed. Oplopanax horridus (Ribes lacustre) (Rubus parviflorus) (Vaccinium membranaceum) (Menziesia ferruginea)	SOIL NAME: (Gleyed) Brunisolic Gray Luvisols; Humo-Ferric Podzols.
HERB: moderately well-developed. Gymnocarpium dryopteris Clintonia uniflora Cornus canadensis Orthilia secunda Pyrola chlorantha Linnaea borealis Tiarella spp. Streptopus amplexifolius	TEXTURE: Sandy loam to loam. DRAINAGE: Good to imperfect. HUMUS FORM: Hemimors; Mormoders. EFFECTIVE ROOTING: Shallow (less than 60 cm).
MOSS: well-developed carpet of feathermosses. Hylocomium splendens Pleurozium schreberi Ptilium crista-castrensis (Rhytidiadelphus spp.)	OTHER FEATURES: Low coarse fragment content with temporary seepage water within 60 cm of the soil surface.

COMMENTS: This e.a. is found throughout the ICHg2. All commercial tree species grow well, but spruce is usually the largest tree. Oplopanax horridus and Gymnocarpium dryopteris, the two primary indicator species, are often poorly developed in eastern sections of the ICHg2, where feathermosses may invade these ecosystems.

DEVIL'S CLUB - OAK FERN - FEATHERMOSS (ICHg2/04)

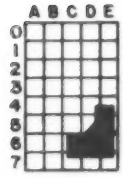
ACTIVITY OR CONCERN	
Species choice:	
Preferred	- Sx, (Cw).
Acceptable	- Hw, Pl, Cw, Ba at high elevations in west.
Logging:	- minimize skid trails to reduce compaction of fine textured soils.
Site preparation:	
Mechanical	- AVOID.
Prescribed fire	- OK, EXCEPT ON SHALLOW SOILS. - burning may improve site productivity when organic horizons are thicker than 15 cm.
Brush hazard:	- variable (generally moderate), can be serious on skid trails. - ASSESS NEED OF BRUSH CONTROL DURING FIRST SURVIVAL SURVEY.
Reforestation:	- PLANT Sx (MINOR Cw).
Other comments:	- frost heaving of planted trees can occur on fine textured soils.

DEVIL'S CLUB - FERN - LEAFY MOSS (ICHg2/05)

SLOPE POSITIONS: Lower and toe slopes, valley floors; drainage channels.

SLOPE RANGE: Gently sloping or level.

ASPECT: All.



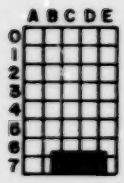
VEGETATION LAYERS	SOILS
TREE: trees large, widely spaced; canopy irregular. Sx Cw Hw (Act)	TERRAIN/PARENT MATERIALS: Morainal (colluvial) deposits; fluvial deposits.
SHRUB: usually well-developed, vigorous. Oplopanax horridus Ribes lacustre (Rubus parviflorus) (Viburnum edule)	SOIL NAME: Gleysols; Gleyed Eutric Brunisols.
	TEXTURE: Silt loam to loam.
HERB: well-developed, [illegible]gorous, moderately diverse. Gymnocarpium dryopteris Tiarella spp. Galium triflorum Mitella nuda Circaea alpina Dryopteris assimilis Streptopus amplexifolius	DRAINAGE: Good to imperfect.
	HUMUS FORM: Mormoders; Hemihumimors.
	EFFECTIVE ROOTING: Relatively shallow (less than 60 cm).
MOSS: poorly to moderately well-developed; feathermosses confined to decaying wood and high spots. Mnium spp. Hylocomium splendens Ptilium crista-castrensis Brachythecium spp.	OTHER FEATURES: Seepage waters commonly occur within 30 cm of the mineral surface and promote abundant, shallow rooting.

COMMENTS: This e.a. is found throughout the ICHg2 but is generally localized in small pockets. These are very productive ecosystems for spruce, cedar, and subalpine fir. Hemlock is usually restricted to elevated microsites and decaying wood. This e.a. has a higher cover of feathermosses than analogous Devil's Club - Fern - Leafy Moss associations in the ICHg1 and g3 variants.

DEVIL'S CLUB - FERN - LEAFY MOSS (ICHg2/05)

ACTIVITY OR CONCERN	
Species choice:	
Preferred	- Sx, Cw.
Acceptable	- Hw; at higher elevations, Ba and Hw may be preferable.
Logging:	- WINTER LOG TO MINIMIZE DISTURBANCE.
Site preparation:	
Mechanical	- NOT RECOMMENDED, because of fine soil textures and wetness of site.
Prescribed fire	- OK, often difficult to get an acceptable burn due to wetness of site and brushing-in.
Brush hazard:	- moderate to severe; disturbance increases the deciduous component. - ASSESS NEED AND URGENCY OF BRUSH CONTROL AT TIME OF PLANTING.
Reforestation:	- PLANT Sx OR Cw IMMEDIATELY. - plant on high spots in wetter areas. - frost heaving may occur on drier areas.
Other comments	- these units must be planned in detail and closely controlled to avoid brush problems and site degradation. TIMING IS CRITICAL. Frequent monitoring of plantation progress is necessary.

HORSETAIL SWAMP (ICHg2/06)



SLOPE POSITIONS: Valley floors; depressions.

SLOPE RANGE: Gently sloping to level.

ASPECT: All.

VEGETATION LAYERS	SOILS
TREE: trees of variable size, normally short; canopy open and irregular. Cw Hw (Sx)	TERRAIN/PARENT MATERIALS: Organic veneers over morainal, fluvial, and lacustrine deposits.
SHRUB: generally well-developed but patchy. Menziesia ferruginea Vaccinium ovalifolium Cornus sericea Viburnum edule (Oplopanax horridus)	SOIL NAME: Gleysols and Humic Gleysols; Terric Mesisols.
HERB: well-developed and diverse. Equisetum arvense Equisetum pratense Equisetum sylvaticum Gymnocarpium dryopteris Carex disperma Tiarella trifoliata	TEXTURE: Silt loam to clay loam.
MOSS: well-developed; diverse. Mnium spp. Hylocomium splendens Ptilium crista-castrensis Rhytidadelphus triquetrus Pleurozium schreberi (Sphagnum spp.)	DRAINAGE: Poor.
	HUMUS FORM: Mistomoders; Mormoders.
	EFFECTIVE ROOTING: Very shallow (less than 40 cm).
	OTHER FEATURES: Water table within 30 cm of the top of the organic horizons; mottles present in the mineral horizons.

COMMENTS: Tree productivity in this e.a. is extremely variable and depends on site nutrient status and degree of soil aeration.

HORSETAIL SWAMP (ICHg2/06)

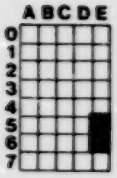
ACTIVITY OR CONCERN	
Species choice:	
Preferred	- Sx, Cw.
Acceptable	- (Hw).
Logging:	- WINTER LOG OR DURING DRIEST PARTS OF SUMMER. - DO NOT DESTROY MOUNDS. - AVOID LOGGING POORER EXAMPLES OF THESE UNITS. - selective logging may be a viable alternative.
Site preparation:	
Mechanical	- AVOID.
Prescribed fire	- AVOID, it will reduce organic horizons. - consider planting chance before prescribing fire. - difficult to do a good job but could be used for species conversion.
Brush hazard:	- variable depending on drainage and richness of site. - usually not required due to open stand structure.
Reforestation:	- FILL-PLANT WITH Sx (MOUNDS ONLY).
Other comments:	- due to difficulty in fully realizing potential productivity of this unit (patchy stocking), all coniferous regeneration should be accepted.

FLOODPLAIN COTTONWOOD SERAL (IOHg2/07)

SLOPE POSITIONS: Valley floors.

SLOPE RANGE: Level (0-2%).

ASPECT: Flat.



VEGETATION LAYERS

TREE: trees very large, open grown.
Act
(Sx)
(Bl)

SHRUB: well-developed, very tall.
Cornus sericea
Alnus viridis ssp. sinuata
Alnus incana ssp. tenuifolia
Salix spp.
Viburnum edule
Lonicera involucrata
Rosa acicularis

HERB: well-developed.
Equisetum arvense
Equisetum pratense
Equisetum hyemale
Galium triflorum
Pyrola asarifolia
Circaea alpina
Athyrium filix-femina
Smilacina racemosa

MOSS: very poorly developed, generally absent except on decaying wood and tree bases.

SOILS

TERRAIN/PARENT MATERIALS:
Active fluvial (alluvial) sediments.

SOIL NAME:
Cumulic and Orthic Regosols.

TEXTURE:
Variable.

DRAINAGE:
Good to rapid.

HUMUS FORM:
Absent or thin Velimoders.

EFFECTIVE ROOTING:
Deep, greater than 60 cm.

OTHER FEATURES:
Very thin surface organic matter accumulations.

COMMENTS: This e.a. is common on floodplain islands and river bottomlands of the Nass River and the lower reaches of its tributaries in the IOHg2. These are very productive ecosystems, but coniferous trees are slow to establish after disturbance because of the intense competition from shrubs and herbs.

FLOODPLAIN COTTONWOOD SERAL (IDHg2/07)

ACTIVITY OR CONCERN	
Species choice:	
Preferred	- Sx.
Acceptable	- Act, (At).
Logging:	- winter logging preferred.
Site preparation:	
Mechanical	- AVOID IF POSSIBLE. - consider only if a committed program of brush control is in place.
Prescribed fire	- OK, but difficult because of poor distribution of slash and rapid brushing-in; timing is important.
Brush hazard:	- SEVERE (sometimes variable). - CONTROL REQUIRED, search for a cost-efficient method to re-establish a coniferous stand.
Reforestation:	- PLANT Sx IMMEDIATELY, preferably with large plug stock.
Other comments:	- PLAN ALL TREATMENTS NECESSARY TO ENSURE "FREE GROWING" CONIFERS; timing is critical if brush is to be controlled. - search for appropriate herbicides.

7 THE ICHg3 VARIANT

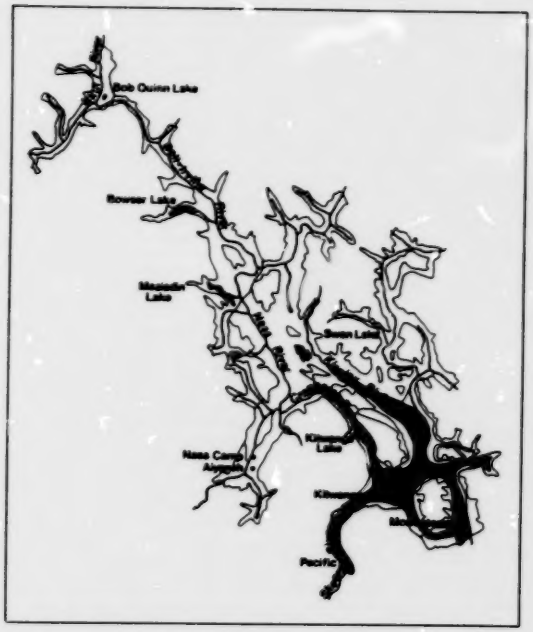


FIGURE 16. The Northwestern Transitional Interior Cedar - Hemlock Subzone, Hazelton Variant (ICHg3) in the Prince Rupert Forest Region.

7.1 Ecosystem Units of the ICHg3

/01 Zonal Hemlock - Moss ecosystem association
/01.1 Hemlock - (Cedar) subassociation
/01.1(a) coarse textured phase
/01.1(b) fine textured phase
/01.2 Subalpine Fir - Spruce subassociation
/01.2(a) coarse textured phase
/01.2(b) fine textured phase
/02 Pine - Lichen ecosystem association
/03 Dry Hemlock - Moss ecosystem association
/03(a) lithic phase
/03(b) coarse textured phase
/04 Devil's Club - Oak Fern - Feathermoss ecosystem association
/04.1 Hemlock - Cedar subassociation
/04.2 Spruce subassociation
/05 Devil's Club - Fern - Leafy Moss ecosystem association
/06 Horsetail - (Skunk Cabbage) Swamp ecosystem association
/07 Black Spruce - Sphagnum ecosystems

Seral ecosystem associations:

/08 Pine - Soopolallie seral ecosystem association
/08(a) lithic phase
/08(b) coarse textured phase
/09 Spruce - Pine - Shrub seral ecosystem association
/09(a) coarse textured phase
/09(b) fine textured phase
/10 Aspen - Birch - Red-osier Dogwood seral ecosystem association
/10(a) hazelnut fluvial phase
/11 Floodplain Cottonwood seral ecosystem association

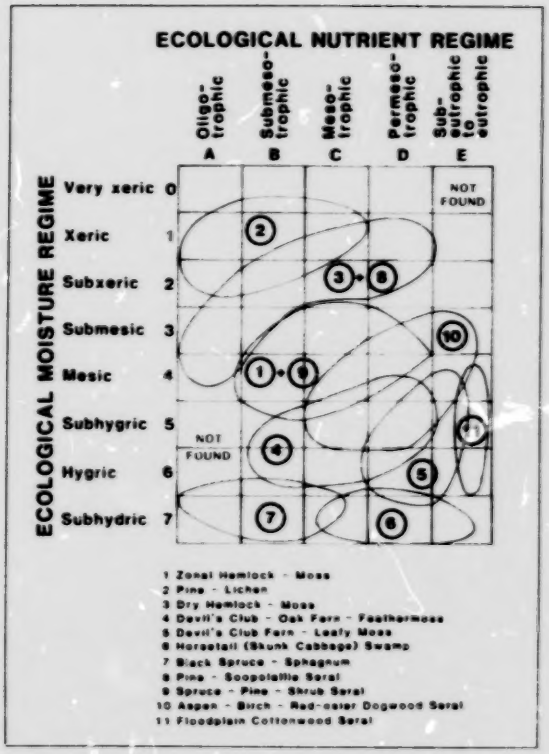


FIGURE 17. Edatopic grid of the ICHg3.

7.2 Seral Variations - [OMg3]

Frequent natural fires and widespread human disturbances have created extensive seral stands of trembling aspen and paper birch. These deciduous stands have very dense shrub and herb layers and little or no moss on the forest floor. These dense shrub and herb layers suppress coniferous regeneration. Consequently these seral ecosystem associations persist and succession is very slow. Because of their abundance and persistence, four major seral ecosystem associations have been identified and described.

7.3 Key to Ecosystem Units of the ICHg3

A Ecosystems with moderate to poor tree growth ..... B

AA Ecosystems with good tree growth ..... J

B *Vaccinium* spp. common to abundant in shrub layers C

C Pl dominates main tree canopy ..... D

D Moss layer dominated by lichens

PINE - LICHEN (ICHg3/02)

DD Moss layer a thick carpet of feathermosses ..... E

E *Shepherdia canadensis* dominates shrub layers

PINE - SOOPOLALLIE SERAL (ICHg3/08)

(i) Shallow soils over bedrock; upper slopes

Lithic phase [ICHg3/08(a)]

(ii) Coarse textured glaciofluvial deposits (terraces, eskers and kames)

Coarse textured phase [ICHg3/08(b)]

EE *Shepherdia canadensis* rare or lacking in shrub layers ..... F

F Herb layer moderately to well developed; Sx often present in main canopy

ZONAL HEMLOCK - MOSS, SUBALPINE FIR - SPRUCE SUBASSOCIATION (ICHg3/01.2)

(i) Glaciofluvial deposits; coarse textured soils

Coarse textured phase [ICHg3/01.2(a)]

(ii) Morainal deposits; fine textured soils

Fine textured phase [ICHg3/01.2(b)]

FF Herb layer very poorly developed; Sx rare or lacking in main canopy

DRY HEMLOCK - MOSS (ICHg3/03)

(i) Morainal veneers over bedrock; shallow soils

Lithic phase [ICHg3/03(a)]

(ii) Coarse textured glaciofluvial and fluvial deposits

Coarse textured phase [ICHg3/03(b)]

CC Hw dominates main canopy ..... G

G Moderately dense stands of small to medium - sized trees; Sx often present

ZONAL HEMLOCK - MOSS, HEMLOCK - (CEDAR) SUBASSOCIATION (ICHg3/01.1)

(i) Washed morainal blankets; glaciofluvial or fluvial deposits with a loamy sand to loamy texture

Coarse textured phase [ICHg3/01.1(a)]

(ii) Morainal blankets with a finer texture

Fine textured phase [ICHg3/01.1(b)]

GG Dense canopy of small short trees; Sx rare or lacking

DRY HEMLOCK - MOSS (ICHg3/03)

(i) Morainal veneers over bedrock; shallow soils

Lithic phase [ICHg3/03(a)]

(ii) Coarse textured glaciofluvial and fluvial deposits

Coarse textured phase [ICHg3/03(b)]

CCC Bl and Sx dominate main canopy

ZONAL HEMLOCK - MOSS, SUBALPINE FIR - SPRUCE SUBASSOCIATION (ICHg3/01.2)

(i) Glaciofluvial deposits; coarse textured soils

Coarse textured phase [ICHg3/01.2(a)]

(ii) Morainal deposits; fine textured soils

Fine textured phase [ICHg3/01.2(b)]

BB Vaccinium spp. rare or lacking in shrub layers ..... H

H Sb dominates main canopy

BLACK SPRUCE - SPHAGNUM (ICHg3/07)

HH Sb rare or lacking in main canopy I

I Equisetum spp. dominate herb layer

HORSETAIL - (SKUNK CABBAGE) SWAMP (ICHg3/06)

II Equisetum spp. rare or lacking in herb layer

SPRUCE - PINE - SHRUB SERAL (ICHg3/09)

(i) Coarse textured glaciofluvial and fluvial deposits

Coarse textured phase [ICHg3/09(a)]

(ii) Sandy loam to silt loam soil texture on moraine blankets

Fine textured phase [ICHg3/09(b)]

J Oplopanax horridus common to abundant in shrub layers ..... K

K Herb layer dominated by ferns (Gymnocarpium, Dryopteris, and Athyrium)

DEVIL'S CLUB - FERN - LEAFY MOSS (ICHg3/05)

KK Athyrium and Dryopteris spp. rare or lacking L

L Hw common to abundant in main canopy

DEVIL'S CLUB - OAK FERN - FEATHERMOSS, HEMLOCK - CEDAR SUBASSOCIATION (ICHg3/04.1)

LL Hw rare or lacking in main canopy

DEVIL'S CLUB - OAK FERN - FEATHER MOSS, SPRUCE SUBASSOCIATION (ICHg3/04.2)

JJ Oplopanax horridus rare or lacking in shrub layers ..... M

M Equisetum spp. dominate herb layer ..... N

N Act dominates main canopy

FLOODPLAIN COTTONWOOD SERAL (ICHg3/11)

NN Act rare or lacking in main canopy

HORSETAIL - (SKUNK CABBAGE) SWAMP (ICHg3/06)

MM Equisetum spp. rare or lacking in herb layer ..... O

O Moss layer poorly developed; deciduous tree species dominate

ASPEN - BIRCH - RED-OSIER DOGWOOD SERAL (ICHg3/10)

(i) Corylus cornuta dominates the shrub layer; primarily fluvial and glaciofluvial deposits in the Kitwanga - Hazelton - Kispiox area

Hazelnut fluvial phase [ICHg3/10(a)]

OO Moss layer moderately to well-developed; coniferous tree species dominate ..... P

P Vaccinium spp. common to abundant in shrub layers

ZONAL HEMLOCK - MOSS, SUBALPINE FIR - SPRUCE SUBASSOCIATION (ICHg3/01.2)

(i) Glaciofluvial deposits; coarse textured soils

Coarse textured phase [ICHg3/01.2(a)]

(ii) Morainal deposits; fine textured soils

Fine textured phase [ICHg3/01.2(b)]

PP Vaccinium spp. rare or lacking in shrub layers

SPRUCE - PINE - SHRUB SERAL (ICHg3/09)

(i) Coarse textured glaciofluvial and fluvial deposits

Coarse textured phase [ICHg3/09(a)]

(ii) Sandy loam to silt loam soil texture on morainal blankets

Fine textured phase [ICHg3/09(b)]

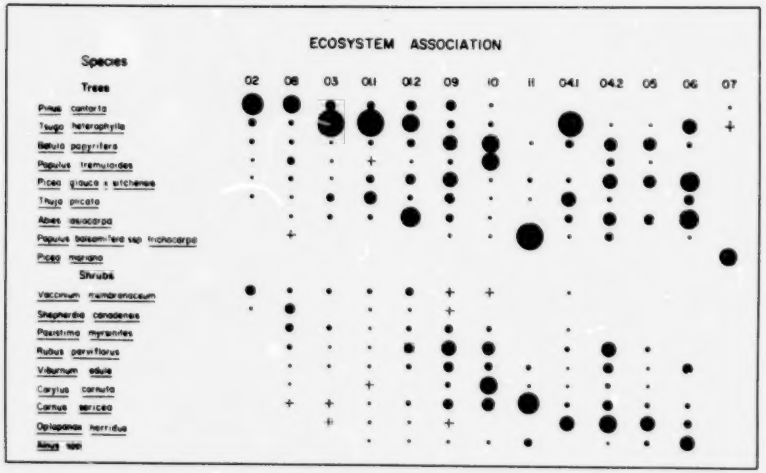


FIGURE 18. Prominence values for the major species of the ICHg3. Diameters of the circles are proportional to the prominance value, which is a measure of plant abundance incorporating both frequency and cover of the species in our sample plots. Prominance value = mean cover multiplied by the square root of freqency. + = trace.

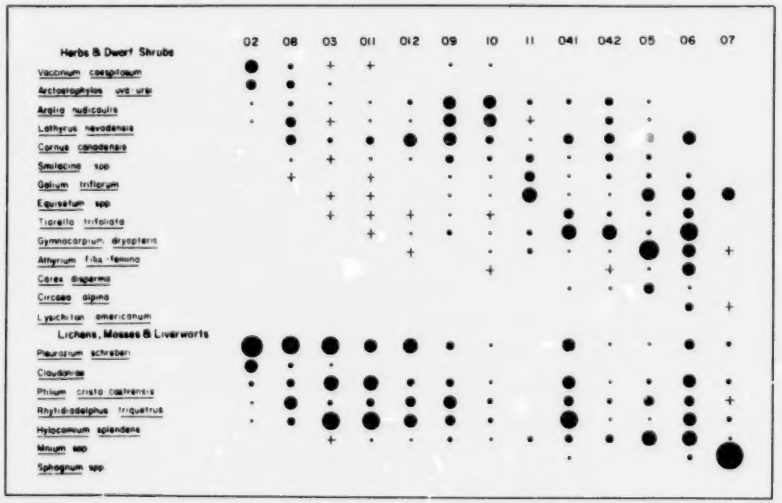


FIGURE 18. (cont'd)

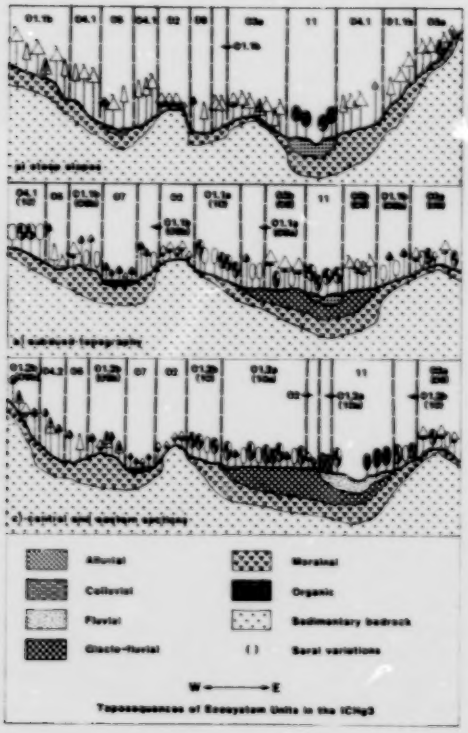


FIGURE 19. Toposequences of ecosystems in the ICHg3. Tree symbols as in Appendix 11.2.

TABLE 9. Habitat features of ecosystem units in the ICHg3

Habitat features	02	03 a	03 b	06 a	06 b	1.1 a	1.1 b	1.2 a	1.2 b
Slope class	level to mod. sloping	level to mod. steep	level to mod. steep	gently sloping	level	gently sloping	gently sloping	gently sloping	gently sloping
Slope position	slope apices	upper, ridges	terraces	upper, ridges	river terraces	middle, terraces	mimic	middle, terraces	middle
Soil parent materials[1]	FO, FG	M	FG, F,(M)	M	FG, F	M, FG, F	M, F	FG	M, F
Soil texture[2]	LS	LS, SL	LS, SL	LS, SL	LS, SL	LS, SL	L, SICL	LS	L, SIL
Drainage class	rapid	rapid	rapid	rapid	rapid	well	well	well	well
Moisture regime	xeric	submesic	submesic	sub-xeric	sub-xeric	mesic	mesic	mesic	mesic
Nutrient regime	submeso-trophic	submeso-trophic	submeso-trophic	submeso-trophic	submeso-trophic	meso-trophic	meso-trophic	meso-trophic	meso-trophic
Soil classification[3]	HFP	HFP, F	HFP, (R)	HFP, F	HFP, (R)	HFP	HFP, GL	SO, GL	GL
Humus form classification[4]	(HR), HR	HR	HR	HR	HR	HR	HR	HR	HR
Rooting depth (cm)	deep, where possible	<40	>60	<40	>60	40->90	40->90	40->90	40->90
Thickness humus layer (cm)	3-5	3-5	5->10	3-5	5->10	5->12	5->12	4->7	4->7
Mineral soil pH (mean)	4.3	4.8	4.9	4.8	4.9	4.8	4.9	5.1	5.1
Humus pH (mean)	3.7	3.0	3.6	3.0	3.6	3.9	3.6	3.9	3.9

TABLE 9. (cont'd)

Habitat features	20 (A / B)	10	10a	4.1	4.2	8B	11	9A	8?
Slope range	level	level to mod. sloping	level to mod. sloping	level to mod. sloping	gentle slopes	level to gently sloping	level to gently sloping	level	level	level
Slope positions	valleys, terraces	middle, upper	middle, lower	valleys, terraces	lower, valleys	lower, valleys	top, valleys	valley floors	valley floors	valley floors
Soil parent materials[1]	FG	M	M	F, FG	M, FG	F, M	F, M	F	G, F, M	G
Soil texture[2]	LS, L	SL, L; LS	SL, L	LS	L, SL	SiL, L	SiCL, CL	variable	organic	organic
Drainage class	well, rapid	well	well	well	well	mod. well, poor	imperfect	well	poor	poor
Moisture regime	aquic	aquic	aquic, subhygric	aquic, subhygric	sub-hygric	sub-hygric	hygric	subhygric, hygric	sub-hydric	sub-hydric
Nutrient regime	meso-trophic	meso-trophic	meso-trophic, perhumo-trophic	meso-trophic, perhumo-trophic	perhumo-trophic	perhumo-trophic	eutrophic	perhumo-trophic, eutrophic	meso-trophic, eutrophic	oligo-trophic
Soil classification[3]	HFP, OR	OL	HFP, OR	HFP, OR	HFP	OR, OGL	O	H	H, O	FO, H
Humus form classification[4]	HAM	HAM, LAM	HAM	HAM, LAM	HAM	LAMM, HAM	HAM, HAM	Absent, HAM	HZAM, HZAMH	HZAM, HZAMH
Rooting depth (cm)	>30	25-30	30-70	>30	<30	<25	<10	<40	<40	< 30
Thickness humus layer (cm)	5-10	5-10	5-10	4-10	4-20	5-10	<40	<3	>80	<1
Mineral soil pH (mean)	5.1	5.1	5.3	5.1	5.0	5.2	5.7	6.5	—	—
Humus pH (mean)	4.2	4.4	5.5	5.4	5.9	6.0	5.2	6.1	—	5.2

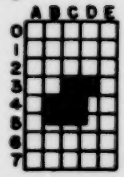
1 Abbreviations of soil parent materials: C - colluvial; F - fluvial; FG - glaciofluvial; L - lacustrine; M - morainal; O - organic; RO - rock outcrop.
2 Abbreviations of soil textures: CL - clay loam; L - loam; LS - loamy sand; SL - sandy loam; SiL - silt loam; SiCL - silty clay loam.
3 Abbreviations of soil order great groups: DR - Dystric Brunisols; DGL - Dark Gray Luvisols; OR - Orthic Brunisols; F - Folisols; FT - Fibrisols; G - Gleysols; GL - Gray Luvisols; HFP - Humo/Ferric Podzols; HG - Humic Gleysols; M - Mesisols; R - Regosols; SB - Sombric Brunisols.
4 Abbreviations of humus form classification: HAM - Hemimor; HAMH - Hemimormic; HZAM - Histomor; HZAMH - Histomormic; LAMM - Lastomormic; MAM - Mormoder; MOR - Hemimor.

TABLE 10. Summary of silvicultural prescriptions and guidelines for IC(g)

Ecosystem unit	Species choice		Primary method of establishment	Site preparation		Brush potential
	Preferred	Acceptable		Mech.	burning	
/01.1	Sx, (Pl)	Pl, (Sxw)	Planting	OK	AVOID	Low
/01.2	Sx	(Pl), (Cw)	Planting	OK	AVOID	Variable
/02	A V O I D	L O G G I N G				
/03(a)	Pl	(Sx)	Natural	AVOID	AVOID	Low
/03(b)	Pl	(Sx), (At)	Natural	AVOID	AVOID	Low
/04.1	Sx, (Pl)	Cw, Sxw	Planting	OK	OK	Moderate
/04.2	Sx	Pl, Sxw, (Cw)	Planting	OK	OK	Moderate
/05	Sx	Sxw, Pl, (Cw)	Planting	AVOID	OK	Severe
/06	Sx, (Cw)	(Cw), (Pl)	Natural	AVOID	AVOID	Variable
/07	A V O I D	L O G G I N G				
/08	Pl	(Sx)	Natural	AVOID	AVOID	Low
/09(a)	Pl	(Sx)	Natural	AVOID	AVOID	Low
/09(b)	Sx	(Pl), (Cw)	Planting	OK	AVOID	Variable
/10	F I R E W O O D	C U T T I N G				
/10(a)	F I R E W O O D	C U T T I N G				
/11	Sx, Cw	Act, (At)	Planting	AVOID	OK	Severe

7.5 Description and Interpretation of Ecosystem Units of the ICHg3

ZONAL HEMLOCK - MOSS, HEMLOCK - (CEDAR)
SUBASSOCIATION (ICHg3/01.1)



SLOPE POSITIONS: Mid-slopes.

SLOPE RANGE: Gently sloping.

ASPECT: All.

VEGETATION LAYERS[1]	SOILS Coarse textured phase ICHg3/01.1(a)	Fine textured phase ICHg3/01.1(b)
TREE: trees rather small; stands often dense. Hw (Pl) (Fd) (Bl) (Sx)	TERRAIN/PARENT MATERIALS: Morainal blankets and veneers; glacio-fluvial terraces and kames; fluvial deposits.	Morainal blankets.
SHRUB: very poorly developed. (Vaccinium membranaceum) (Amelanchier alnifolia) (Acer glabrum) (Paxistima myrsinites)	SOIL NAME: Orthic Humo-Ferric Podzols.	Luvisolic Humo-Ferric Podzols; Podzolic Gray Luvisols.
HERB: very poorly developed. (Orthilia secunda) (Cornus canadensis) (Chimaphila umbellata) (Pyrola chlorantha) (Platanthera orbiculata) (Clintonia uniflora) (Linnaea borealis)	TEXTURE: Loamy sand to loam.	Loam to silty clay loam.
MOSS: well-developed carpet of feathermosses. Hylocomium splendens Ptilium crista-castrensis Pleurozium schreberi Rhytidiadelphus triquetrus	HUMUS FORM: Hemimors.	Hemimors.
	EFFECTIVE ROOTING: Deep (40-90 cm).	Deep(greater than 60 cm).
	OTHER FEATURES: Subsurface mineral horizons have an abundance of coarse fragments.	Fine textured soils show luvisolic development.

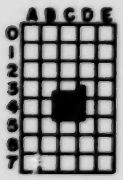
COMMENTS: This subassociation represents the climatic climax ecosystem for the ICHg3, but is relatively uncommon because of the widespread occurrence of persistent seral ecosystem associations (ICHg3/09 + 10). It is mostly found at higher elevations on north-facing slopes, away from the main valley floors.

[1] Parentheses indicate species that may have low cover or may not be consistently present.

ZONAL HEMLOCK - MESIC, HEMLOCK - (CEDAR) SUBASSOCIATION (ICHg3/01.1)

ACTIVITY OR CONCERN	
Species choice:	
Preferred	- Sx, (Pl).
Acceptable	- Pl, (Sxw).
	- Hw on north slopes with fine textured soils.
Logging:	- summer or winter.
	- AVOID EXCESSIVE DISTURBANCE.
Site preparation:	
Mechanical	- OK.
Prescribed fire	- AVOID BURNING; organic horizons are beneficial.
	- light burn OK if only L horizon is consumed.
Brush hazard:	- low; severity of problem is a function of the number of deciduous trees in the stand.
Reforestation:	- PLANT Sx OR Pl.
	- late frosts and dry spring affect establishment.
Other comments:	- establishment of spruce will be hindered by the Pineus aphid.
	- if advanced regeneration is used, assess for spacing at time of regeneration survey.

ZONAL HEMLOCK - MOSS, SUBALPINE FIR - SPRUCE
SUBASSOCIATION (ICHg3/01.2)



SLOPE POSITIONS: Mid-slopes.

SLOPE RANGE: Gently to moderately sloping.

ASPECT: All.

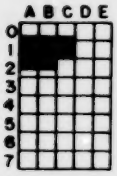
VEGETATION LAYERS	SOILS Coarse textured phase ICHg3/01.2(a)	 Fine textured phase ICHg3/01.2(b)
TREE: moderate to good growth; variable species composition. Bl Pl Sx (Hw) (Ep)	TERRAIN/PARENT MATERIALS: Glaciofluvial deposits.	Morainal blankets.
	SOIL NAME: Eluviated Sombric Brunisols.	Podzolic and Brunisolic Gray Luvisols.
SHRUB: moderately to well-developed; abundant sub-alpine fir regeneration. Vaccinium membranaceum Rubus parviflorus Viburnum edule (Rosa acicularis) (Amelanchier alnifolia) (Shepherdia canadensis) (Alnus viridis ssp. sinuata)	TEXTURE: Sandy loam to loam.	Silt loam to loam.
	DRAINAGE: Good.	Good to moderately good.
	HUMUS FORM: Hemimors.	Hemimors.
HERB: well-developed compared to ecosystems of the ICHg3/01.1. Cornus canadensis Clintonia uniflora Linnaea borealis Chimaphila umbellata Pyrola chlorantha	EFFECTIVE ROOTING: Deep.	Deep.
	OTHER FEATURES: Coarse fragment content greater than 35%.	Coarse fragment content greater than 35%.
MOSS: well-developed carpet of feathermosses. Ptilium crista-castrensis Pleurozium schreberi Rhytidiadelphus triquetrus Hylocomium splendens		

COMMENTS: This subassociation is found in eastern sections of the ICHg3 where sub-boreal climatic influences are strong. Typical at low elevations in the upper Kitseguecla and lower Kispiox and Bulkley river valleys, especially where cold air drainage occurs.

ZONAL HEMLOCK - MOSS, SUBALPINE FIR - SPRUCE SUBASSOCIATION (ICHg3/01.2)

ACTIVITY OR CONCERN	
Species choice:	
Preferred	- Sx.
Acceptable	- (Pl), (C_w).
Logging:	- MINIMIZE DISTURBANCE to avoid possible soil compaction on fine textured soils.
Site preparation:	
Mechanical	- OK, BUT DO NOT SCALP. - drag equipment sufficient to provide planter access.
Prescribed fire	- AVOID; LIGHT BURN OK if no more than litter (L) layer consumed.
Brush hazard:	- variable; aggravated by disturbance.
Reforestation:	- PLANT Sx OR Pl. - plant on mounds rather than in depressions or gouges. - late frosts and dry springs affect establishment. - fine textured soil susceptible to frost-heaving.
Other comments:	- if birch or aspen present problems consider "hack-and-squirt" before logging.

PINE - LICHEN (ICmg5/02)



SLOPE POSITIONS: Slope apices and ridge crests; terraces.

SLOPE RANGE: Level to moderately sloping (0-25%).

ASPECT: All.

VEGETATION LAYERS	SOILS
TREE: trees small, of low vigour; spacing open to fairly dense. Pl	TERRAIN/PARENT MATERIALS: Rock outcrops; glaciofluvial outwash terraces, eskers.
SHRUB: low-lying, poorly to moderately developed. Vaccinium membranaceum (Salix scouleriana) (Amelanchier alnifolia) (Shepherdia canadensis) (Rosa acicularis)	SOIL NAME: Orthic Humo-Ferric Podzols with minor eluviated Orthic Dystrics.
	TEXTURE: Loamy sand to sand.
	DRAINAGE: Rapid.
HERB: poorly to moderately well-developed. Vaccinium caespitosum Arctostaphylos uva-ursi Melampyrum lineare Chimaphila umbellata Festuca occidentalis Oryzopsis asperifolia Oryzopsis pungens Hieracium albiflorum	HUMUS FORM: Xeromors; mesimors.
	EFFECTIVE ROOTING: Shallow on lithic sites; deep in glaciofluvial materials.
MOSS: a mixture of mosses and lichens. Pleurozium schreberi Cladina spp. Peltigera spp. Cladonia spp. Stereocaulon spp. (Polytrichum juniperinum)	OTHER FEATURES: Very thin organic horizons with little water-holding capacity.

COMMENTS: This association occurs frequently on exposed and rapidly drained sites along the Skeena and Bulkley rivers; uncommon elsewhere. This e.s. represents the driest, most extreme forest sites in the Zone, sites that are submarginal for commercial timber production.

FIRE - LIGHTS (Temporary)

ACTIVITY OR CONCERN

AVOID LOGGING

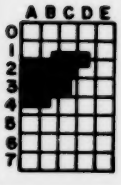
These ecosystems are submarginal for timber production. If they are included within larger openings, then consider their harvesting as timber mining.

DRY HEMLOCK - MOSS (ICHg3/03)

SLOPE POSITIONS: Upper slopes and ridge crests; some terraces and benches.

SLOPE RANGE: Level to moderately steep (0-45%+).

ASPECT: All.



VEGETATION LAYERS	SOILS Lithic phase ICHg3/03(a)	 Coarse textured phase ICHg3/03(b)
TREE: typically a dense canopy of small, short trees. Hw Pl (Bl) (Cw)	TERRAIN/PARENT MATERIALS: Morainal (colluvial) veneers over bedrock.	Coarse-textured glaciofluvial and fluvial deposits.
SHRUB: very poorly developed. (Vaccinium membranaceum) (Menziesia ferruginea) (Paxistima myrsinites) (Rosa acicularis) (Amelanchier alnifolia)	SOIL NAME: Orthic Humo-Ferric Podzols; Typic Folisols.	Orthic Humo-Ferric Podzols; Orthic Dystric Brunisols.
HERB: very poorly developed. (Chimaphila umbellata) (Orthilia secunda) (Cornus canadensis) (Pyrola chlorantha) (Linnaea borealis) (Goodyera oblongifolia) (Platanthera orbiculata)	TEXTURE: Loamy sand to sandy loam.	Loamy sand to sandy loam.
	DRAINAGE: Rapid.	Rapid.
	HUMUS FORM: Hemimors.	Hemimors.
MOSS: generally well-developed carpet of feathermosses. Hylocomium splendens Pleurozium schreberi (Ptilium crista-castrensis) (Rhytidiadelphus triquetrus) (Dicranum polysetum)	EFFECTIVE ROOTING: Shallow (less than 40 cm).	Deep (greater than 60 cm).
	OTHER FEATURES: Thin accumulation of organic materials (less than 5 cm).	High coarse fragment content (sometimes greater than 40%).

COMMENTS: This e.a. is uncommon in the ICHg3 because of the variant's history of disturbance; most such dry, poor sites presently are occupied by seral ecosystems belonging to the ICHg3/08.

DRY HEMLOCK - MOSS (ICHg3/03)

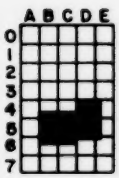
ACTIVITY OR CONCERN	
Species choice:	
Preferred	- Pl.
Acceptable	- (Sx); a minor component of deciduous trees.
Logging:	- ADJUST TO PROMOTE Pl REGENERATION.
Site preparation:	
Mechanical	- AVOID; humus horizons are very beneficial on these units. -occasionally OK, but DO NOT SCALP.
Prescribed fire	- DO NOT BURN. - a light burn (spring) is acceptable if only L horizon is consumed.
Brush hazard:	- low.
Reforestation:	- IF REQUIRED PLANT Pl.
Other comments:	- consider removing unacceptable advanced regeneration at time of spacing. - make necessary adjustments to promote natural seeding-in of Pl.

DEVIL'S CLUB - OAK FERN - FEATHERMOSS, HEMLOCK - CEDAR
SUBASSOCIATION (ICHg3/04.1)

SLOPE POSITIONS: Primarily lower slopes.

SLOPE RANGE: Primarily gentle slopes.

ASPECT: All.



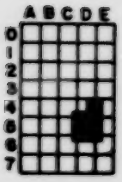
VEGETATION LAYERS	SOILS
TREE: most species have moderately good vigour. ~~Hw~~ ~~Cw~~ (Sx) (Fd)	TERRAIN/PARENT MATERIALS: Morainal blankets; fluvial over morainal deposits; glaciofluvial deposits.
SHRUB: moderately well-developed. Oplopanax horridus Ribes lacustre Viburnum edule Rubus parviflorus (Vaccinium ovalifolium) (Vaccinium membranaceum) (Menziesia ferruginea)	SOIL NAME: Orthic Humo-Ferric Podzols. TEXTURE: Loam to silt loam.
HERB: moderately to well-developed. Gymnocarpium dryopteris Tiarella spp. Streptopus amplexifolius Cornus canadensis Orthilia secunda (Clintonia uniflora)	DRAINAGE: Good. HUMUS FORM: Mormoder. EFFECTIVE ROOTING: Deep (greater than 70 cm).
MOSS: well-developed. Hylocomium splendens Ptilium crista-castrensis Pleurozium schreberi Rhytidiadelphus triquetrus (Mnium spp.)	OTHER FEATURES: Temporary seepage is present at depths below 60 cm; high coarse fragment content in subsurface horizons.

COMMENTS: This subassociation occurs throughout the ICHg3 and is most common above the major valley floors. The herb layer is lush compared with Zonal Hemlock - Moss ecosystems, but a carpet of mosses is still very visible.

DEVIL'S CLUB - OAK FERN - FEATHERMOSS, HEMLOCK - CEDAR
SUBASSOCIATION (ICHg3/OA.1)

ACTIVITY OR CONCERN	
Species choice:	
Preferred	- Sx.
Acceptable	- Cw, (Pl), Sxw.
Logging:	- PROMOTE Pl REGENERATION. - MINIMIZE DISTURBANCE TO AVOID COMPACTION ON FINE TEXTURED SOIL.
Site preparation:	
Mechanical	- OK, but aggravates brush and compaction problems.
Prescribed fire	- OK, BUT USE WITH CARE. - burn should not consume more than litter (L) layer.
Brush hazard	- moderate (occasionally severe).
Reforestation:	- PLANT IMMEDIATELY WITH Sx. - late frost and dry spring affect establishment.
Other comments:	- a variety of soils exist within this subassociation; determine texture and amount of seepage prior to designating constraints.

DEVIL'S CLUB - OAK FERN - FEATHERMOSS,
SPRUCE SUBASSOCIATION (IDHg3/04.2)



SLOPE POSITIONS: Lower to valley floors.

SLOPE RANGE: Level to gently sloping (0-15%).

ASPECT: All.

VEGETATION LAYERS	SOILS
TREE: trees moderately large, good vigour; note lack of western hemlock. Sx Bl (Ep)	TERRAIN/PARENT MATERIALS: Fluvial, morainal, recent fluvial over glaciofluvial deposits.
SHRUB: well-developed. Oplopanax horridus Viburnum edule Cornus sericea Rubus parviflorus Lonicera involucrata	SOIL NAME: Orthic Eutric Brunisols; Gleyed Dark Gray Luvisols.
	TEXTURE: Silt loam to loam.
HERB: well-developed; diverse. Gymnocarpium dryopteris Cornus canadensis Clintonia uniflora Galium triflorum Tiarella spp. Actaea rubra Rubus pubescens Smilacina racemosa Osmorhiza chilensis Aralia nudicaulis Smilacina stellata	DRAINAGE: Moderately good to poor. HUMUS FORM: Leptomoders; Mormoders. EFFECTIVE ROOTING: Deep (greater than 70 cm). OTHER FEATURES: Seepage and mottling occur within 60 cm of the soil surface.
MOSS: poorly to moderately developed. (Ptilium crista-castrensis) (Hylocomium splendens) (Rhytidiadelphus triquetrus) (Mnium spp.)	

COMMENTS: This subassociation is found mainly at the northern and eastern extremities of the IDHg3 where sub-boreal climatic influences are strong.

Common in the Kispiox, Kitseguecla, and upper Kitwanga river valleys. Sites are usually subject to cold air ponding. Western hemlock is generally absent and subalpine fir dominates the advanced regeneration.

DEVIL'S CLUB - OAK FERN - FEATHERMOSS,
SPRUCE - SUBALPINE FIR SUBASSOCIATION (IOmg3/04.2)

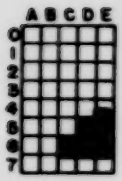
ACTIVITY OR CONCERN	
Species choice:	
Preferred	- Sx.
Acceptable	- Pl, Sxw, (Dw).
Logging:	- WINTER LOG TO MINIMIZE COMPACTION OF FINE TEXTURED SOILS. - in summer use wide-tracked vehicles or yard during dry periods.
Site preparation:	
Mechanical	- OK, but aggravates brush problem and makes fine textured soils susceptible to frost heaving. - often a good alternative to burning. - drag equipment should be sufficient to provide planter access.
Prescribed fire	- OK, USE WITH CARE. - burn should consume no more than litter (L) layer.
Brush hazard:	- moderate (occasionally severe).
Reforestation:	- PLANT Sx OR Pl. - plant on mounds rather than in depressions or gouges because of cold air ponding.
Other comments:	- late frost and dry spring affect establishment.

DEVIL'S CLUB - FERN - LEAFY MOSS (ICHg3/05)

SLOPE POSITIONS: Toe slopes and valley floors; gullies and drainage channels.

SLOPE RANGE: Level to gently sloping (0-10%).

ASPECT: All.



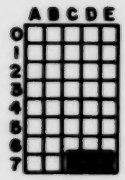
VEGETATION LAYERS	SOILS
TREE: trees generally large, widely spaced. Sx Cw Hw (Act) (Bl)	TERRAIN/PARENT MATERIALS: Primarily fluvial deposits; also washed morainal and lacustrine deposits.
SHRUB: well-developed, especially in stand openings. Oplopanax horridus Ribes lacustre Lonicera involucrata Viburnum edule Rubus parviflorus Cornus sericea	SOIL NAME: Humic Gleysols; Gleyed subgroups of Luvisols and Brunisols.
	TEXTURE: Silt loam to clay loam.
	DRAINAGE: Imperfect.
HERB: well-developed; diverse. Athyrium filix femina Gymnocarpium dryopteris Dryopteris assimilis Tiarella spp. Streptopus amplexifolius Circaea alpina	HUMUS FORM: Hemihumimors; Humoders.
	EFFECTIVE ROOTING: Shallow (less than 45 cm).
	OTHER FEATURES: Permanent seepage and/or water tables close to mineral surface; mottling present close to soil surface.
MOSS: poorly to moderately developed. Mnium spp. (Rhytidiadelphus triquetrus) (Brachythecium spp.)	

COMMENTS: This e.a. is found in small pockets throughout most of ICHg3. These are productive ecosystems for most tree species. Western hemlock is confined to elevated hummocks or decaying wood and does not reach the size of other species. Where past disturbances have occurred, black cottonwood and paper birch are the main stand components and light-demanding shrub species dominate over Oplopanax horridum.

DEVIL'S CLUB - FERN - LEAFY MOSS (ICHg3/05)

ACTIVITY OR CONCERN	
Species choice:	
Preferred	- Sx.
Acceptable	- Sxw, Pl, (Cw).
Logging:	- MINIMIZE DISTURBANCE TO AVOID AGGRAVATING BRUSH PROBLEM. - Winter logging is preferred (on snow and frozen ground).
Site preparation:	
Mechanical	- not recommended because of possible fine soil textures, wetness of site, and brush invasion.
Prescribed fire	- OK, unlikely to cause serious site degradation.
Brush hazard:	- severe, particularly if disturbed. - ASSESS NEED AND URGENCY OF CONTROL AT TIME OF PLANTING.
Reforestation:	- PLANT Sx IMMEDIATELY (WITH MINOR Cw). - late frost and dry spring affect establishment.
Other comments:	- these units must be planned in detail and closely controlled to avoid brush problems. TIMING IS CRITICAL. Frequent monitoring of plantation progress is necessary.

HORSETAIL - (SKUNK CABBAGE) SWAMP (ICHg3/06)



SLOPE POSITIONS: Slope bases, valley floors and depressions.

SLOPE RANGE: Level to very gently sloping (0-2%).

ASPECT: All.

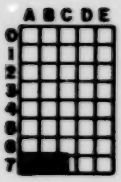
VEGETATION LAYERS	SOILS
TREE: trees small to moderately large; canopy irregular, many openings. Sx Dw Bl (Hw)	TERRAIN/PARENT MATERIALS: Organic veneers over fluvial, lacustrine, and washed morainal deposits. SOIL NAME: Terric and Orthic Mesisols; Orthic Gleysols.
SHRUB: irregular cover, generally well-developed in stand openings. Alnus viridis ssp. sinuata Lonicera involucrata Viburnum edule Cornus sericea (Menziesia ferruginea) (Oplopanax horridus)	TEXTURE: Organic. DRAINAGE: Poor.
HERB: well-developed, diverse. Equisetum spp. Gymnocarpium dryopteris Athyrium filix-femina Carex disperma Gaultheria hispidula Rubus pubescens (Lysichiton americanum)	HUMUS FORM: Histomors; Histomoders. EFFECTIVE ROOTING: Shallow (less than 40 cm). OTHER FEATURES: Thick, wet surface organic layers up to 1 m in depth; water table often within 30 cm of the top of the organic horizons.
MOSS: generally well-developed; diverse. Mnium spp. Rhytidiadelphus triquetrus Ptilium crista-castrensis Pleurozium schreberi Hylocomium splendens (Sphagnum spp.)	

COMMENTS: This e.a. is found throughout the ICHg3 but is neither common nor extensive. It is of minor importance to forest management because of its limited extent. Lysichiton americanum is an excellent indicator species when present, but is generally lacking in eastern parts of the variant. Equisetum spp. and Carex disperma are usually more reliable indicators.

HORSETAIL - (SKUNK CABBAGE) SWAMP (ICHg3/06)

ACTIVITY OR CONCERN	
Species choice:	
Preferred	- Sx, (Cw).
Acceptable	- (Cw), (Pl).
Logging:	- WINTER LOG OR DURING DRIEST PARTS OF SUMMER. - DO NOT DESTROY MOUNDS. - AVOID LOGGING POORER EXAMPLES OF THESE UNITS. - selective logging may be a viable alternative.
Site preparation:	
Mechanical	- AVOID.
Prescribed fire	- AVOID; it will reduce organic horizons. - consider planting chance before prescribing fire. - difficult to do a good job but could be used for species conversion.
Brush hazard:	- variable; depends on drainage and richness of site. - usually not required due to open stand structure.
Reforestation:	- FILL-PLANT WITH Sx (MOUNDS ONLY).
Other comments:	- due to difficulty in fully realizing potential productivity of this unit (patchy stocking), all coniferous regeneration should be accepted.

BLACK SPRUCE - SPHAGNUM (IOHg3/07)



SLOPE POSITIONS: Valley floors, depressions.

SLOPE RANGE: Level (0-2%).

ASPECT: Flat.

VEGETATION LAYERS	SOILS
TREE: trees small, stunted, irregular in height. Sb (Pl)	TERRAIN/PARENT MATERIALS: Thick organic deposits.
SHRUB: moderately to well-developed, clumped. Salix spp. Betula glandulosa Ledum groenlandicum Spiraea douglasii (Kalmia microphylla)	SOIL NAME: Mesic Fibrisols and Terric Mesisols. TEXTURE: Organic.
HERB: well-developed, variable in composition. Carex spp. Equisetum fluviatile Menyanthes trifoliata (Gaultheria hispidula) (Andromeda polifolia) (Vaccinium oxycoccos)	DRAINAGE: Poor. HUMUS FORM: Histomors; Histomoders. EFFECTIVE ROOTING: Very shallow (less than 30 cm).
MOSS: a solid hummocky mat of peat moss. Sphagnum spp. Tomenthypnum nitens Aulacomnium palustre	OTHER FEATURES: Permanent cold standing water within 30 cm of uppermost organic horizons.

COMMENTS: Bogs occur at low elevations in the main valleys of the IOHg3 but are not common and are restricted to poorly drained frost pockets. Black spruce - peat moss ecosystems are distinctive and unmistakably different from any other ecosystem unit described in this guide. These ecosystems are not considered suitable for commercial timber production.

BLACK SPRUCE - SPHAGNUM (ICHg3/07)

ACTIVITY OR CONCERN

AVOID LOGGING

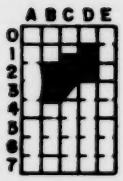
These ecosystems are submarginal for timber production. If they are included within larger openings, then consider their harvesting as timber mining.

PINE - SOOPOLALLIE SERAL (ICHg3/08)

SLOPE POSITIONS: River terraces, benches, ridges and upper slopes.

SLOPE RANGE: Level to gently sloping (0-15%).

ASPECT: All.



VEGETATION LAYERS	SOILS Lithic phase ICHg3/08(a)	 Coarse textured phase ICHg3/08(b)
TREE: trees somewhat larger and taller than in ICHg3/02. Pl (At) (Ep)	TERRAIN/PARENT MATERIALS: Morainal blankets and veneers over bedrock.	Primarily glacio-fluvial terraces; some eskers and kames.
SHRUB: moderately developed. Shepherdia canadensis Amelanchier alnifolia Rosa acicularis Rubus parviflorus Vaccinium membranaceum	SOIL NAME: Humo-Ferric Podzols; Folisols.	Humo-Ferric Podzols; Dystric Brunisols.
	TEXTURE: Loamy sand to sandy loam.	Loamy sand to sandy loam.
HERB: moderately diverse and well-developed. Linnaea borealis Cornus canadensis Goodyera oblongifolia Chimaphila umbellata Lathyrus nevadensis Arctostaphylos uva-ursi Vaccinium caespitosum Oryzopsis asperifolia Oryzopsis pungens Fragaria virginiana	DRAINAGE: Rapid.	Rapid.
	HUMUS FORM: Hemimors.	Hemimors.
	EFFECTIVE ROOTING: Shallow (less than 40 cm).	Deep (greater than 60 cm).
	OTHER FEATURES: Thin accumulation of organic materials (less than 5 cm).	High coarse fragment content (sometimes greater than 40%).
MOSS: a well-developed moss carpet. Rhytidiadelphus triquetrus (Ptilium crista-castrensis) (Hylocomium splendens)		

COMMENTS: Common along the major river valleys. This seral e.a. is slightly moister and more productive than the Pine - Lichen e.a. (ICHg3/02). Growth of pine is marginal for commercial timber production. If allowed to reach climax, this association would develop into the Dry Hemlock - Moss e.a. (ICHg3/03).

PINE - SOOPOLALLIE SERAL (ICHg3/08)

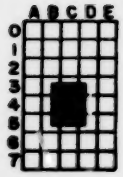
ACTIVITY OR CONCERN	
Species choice:	
Preferred	- Pl.
Acceptable	- (Sx); a minor component of deciduous trees.
Logging:	- ADJUST TO PROMOTE Pl REGENERATION.
Site preparation:	
Mechanical	- AVOID; humus horizons are very beneficial on these units. - occasionally OK, but DO NOT SCALP.
Prescribed fire	- DO NOT BURN. - a light burn (spring) is acceptable if only L horizon is consumed.
Brush hazard:	- low.
Reforestation:	- if required plant Pl.
Other comments:	- consider removing unacceptable advanced regeneration at time of spacing. - make necessary adjustments to promote natural seeding-in of Pl.

SPRUCE - PINE - SHRUB SERAL (ICHg3/U9)

SLOPE POSITIONS: Valley floors and terraces; middle to lower slopes in rolling terrain.

SLOPE RANGE: Level to moderately sloping (0-25%+).

ASPECT: All.



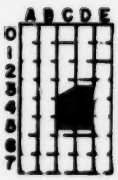
VEGETATION LAYERS	SOILS Coarse textured phase ICHg3/U9(a)	 Fine textured phase ICHg3/U9(b)
TREE: composition variable. Sx Pl (Ep) (At)	TERRAIN/PARENT MATERIALS: Glaciofluvial and fluvial deposits.	Morainal blankets.
SHRUB: well to moderately well-developed. Rubus parviflorus Viburnum edule Cornus sericea Rosa acicularis Lonicera involucrata Symphoricarpos albus	SOIL NAME: Humo-Ferric Podzols; Dystric Brunisols. TEXTURE: Loamy sand to loam.	(Gleyed) Brunisolic Gray Luvisols. Sandy loam; loam; silt loam.
HERB: generally diverse and well-developed. Aralia nudicaulis Lathyrus nevadensis Smilacina spp. Cornus canadensis Clintonia uniflora Rubus pubescens Orthilia secunda Gallium boreale Pyrola asarifolia	DRAINAGE: Good. HUMUS FORM: Hemimors. EFFECTIVE ROOTING: Deep (greater than 70 cm).	Good. Mormoders; Hemimors. Variable, depending on soil structure (25-90 cm).
MOSS: well to moderately well-developed. Rhytidiadelphus triquetrus Ptilium crista-castrensis Pleurozium schreberi Hylocomium splendens (Mnium spp.)	OTHER FEATURES: Soils have a high coarse fragment content.	Greater moisture and nutrient holding capacity than ICHg3/U9(a).

COMMENTS: This e.a. is widespread at low elevations throughout the ICHg3, but is especially common in eastern portions of the variant. Many of these ecosystems will develop into a Subalpine Fir - Spruce subassociation of the Zonal Hemlock - Moss e.a. (ICHg3/01.2), while others will eventually become dominated by hemlock (ICHg3/01.1) if succession is allowed to proceed. The stands are dominated by spruce in association with pine and birch, with aspen occuring only occasionally. Subalpine fir dominates the advanced regeneration.

SPRUCE - PINE - SHRUB SERAL (ICHg3/09)

ACTIVITY OR CONCERN	Coarse textured phase ICHg3/09(a)	Fine textured phase ICHg3/09(b)
Species choice:		
Preferred	- Pl.	- Sx.
Acceptable	- (Sx); a minor component of deciduous trees.	- (Pl), (Cw).
Logging:	- ADJUST TO PROMOTE Pl REGENERATION.	- MINIMIZE DISTURBANCE TO AVOID POSSIBLE SOIL COMPACTION ON FINE TEXTURED SOILS.
Site preparation:		
Mechanical	- AVOID; humus horizons are very beneficial on these units. - occasionally OK, but DO NOT SCALP.	- OK, but DO NOT SCALP. - drag equipment sufficient to provide planter access.
Prescribed fire	- DO NOT BURN. - a light burn (spring) is acceptable if only L horizon is consumed.	- AVOID. - light burn OK if no more than litter (L) layer is consumed.
Brush hazard:	- low.	- variable; aggravated by disturbance.
Reforestation:	- if required plant Pl.	- PLANT Sx OR Pl. - plant on mounds rather than in depressions or gouges. - late frost and dry spring affect establishment. - fine textured soil susceptible to frost heaving.
Other comments:	- consider removing unacceptable advanced regeneration at time of spacing. - make necessary adjustments to promote natural seeding-in of Pl.	- if birch or aspen present a particular problem consider "hack-and-squirt" before logging.

ASPEN - BIRCH - RED-OSIER DOGWOOD SERAL (ICHg3/10)



SLOPE POSITIONS: Middle to lower slopes.

SLOPE RANGE: Level to moderately sloping (0-25%).

ASPECT: All.

VEGETATION LAYERS	SOILS
TREE: stands dominantly or completely deciduous. At Ep	TERRAIN/PARENT MATERIALS: Morainal blankets with some fluvial modification.
SHRUB: very well-developed, tall, and vigorous. Cornus sericea Rubus parviflorus Viburnum edule Rosa acicularis Lonicera involucrata Paxistima myrsinites Amelanchier alnifolia Symphoricarpos albus Salix scouleriana	SOIL NAME: Humo-Ferric Podzols; Eutric Brunisols; Podzolic Gray Luvisols. TEXTURE: Sandy loam to loam.
HERB: very well-developed, vigorous, and diverse. Aralia nudicaulis Lathyrus nevadensis Smilacina racemosa Clintonia uniflora Pyrola asarifolia Cornus canadensis Gallum triflorum Osmorhiza chilensis Rubus pubescens Smilacina stellata	DRAINAGE: Good. HUMUS FORM: Mormoders. EFFECTIVE ROOTING: Variable (30-70 cm). [illegible]: Relatively nutrient-rich organic and mineral horizons.
MOSS: very poorly developed, frequently absent.	

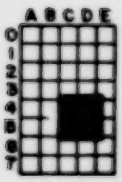
COMMENTS: This e.a. is very common at low elevations in the central part of the ICHg1. The stands are productive with a heavy or totally deciduous cover. Coniferous regeneration is sparse and suppressed by the heavy growth of shrubs and herbs. Succession to conifers is extremely slow.

ASPEN - BIRCH - RED-OSIER DOGWOOD SERAL (ICHg3/10)

ACTIVITY OR CONCERN

These ecosystems have little timber value at present. Rehabilitation to produce a conifer stand is very costly. Activity in this unit should be restricted to firewood cutting until effective methods of conversion are developed.

ASPEN - BIRCH - RED-OSIER DOGWOOD SERAL:
HAZELNUT FLUVIAL PHASE [IOMg3/10(a)]



SLOPE POSITIONS: Valley floors and terraces; upper to lower slopes in rolling terrain.

SLOPE RANGE: Level to moderately sloping (0-35%).

ASPECT: All.

VEGETATION LAYERS	SOILS
TREE: stands dominantly or totally deciduous cover. (a) (b) (and) (not)	TERRAIN/PARENT MATERIALS: Primarily fluvial and glaciofluvial.
SHRUB: very well-developed, vigorous, and tall. Corylus cornuta Lonicera involucrata Rubus parviflorus Rosa acicularis Rosa nutkana Viburnum edule Lonicera involucrata Salix scouleriana Acer glabrum Symphoricarpos albus	SOIL NAME: Humo-Ferric Podzols; orthic and cluviated Dystric Brunisols.
	TEXTURE: Loamy sand.
	DRAINAGE: Good.
	HUMUS FORM: Mormoders; Leptomoders.
HERB: very well-developed, vigorous, and diverse. Lathyrus nevadensis Aralia nudicaulis Stellaria stellata Pyrola asarifolia Rubus pubescens Galium triflorum Galium boreale Achyrtina chilensis Stellaria borealis Cornus canadensis	EFFECTIVE ROOTING: Deep (greater than 50 cm).
	OTHER FEATURES: High coarse fragment content erratically below 75 cm.
MOSS: very poorly developed; frequently absent.	

COMMENTS: This phase is very common at low elevations in the central part of the Dingo, and is characteristic of the Hazelnut-Horsetail-Fluvial site. There are very productive sites for ungulates and birds. Native grass is, but is rarely a major stand component.

[illegible] - [illegible] - [illegible] [illegible]
[illegible] [illegible] [illegible] (2U4S/1U18)

[illegible]

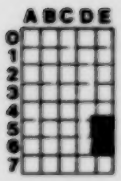
These ecosystems have little timber value at present. Rehabilitation to produce a conifer stand is very costly. Activity in this unit should be restricted to firewood cutting until effective methods of conversion are developed.

FLOODPLAIN COTTONWOOD SERAL (ICHg1/11)

SLOPE POSITION: Valley floors.

SLOPE RANGE: Level (0-2%).

ASPECT: Flat.



VEGETATION LAYERS	SOILS
TREE: trees very large, open grown. Act (Sx) (Bl)	TERRAIN/PARENT MATERIALS: Active fluvial (alluvial) sediments.
SHRUB: well-developed and very tall. Cornus sericea Alnus viridis ssp. sinuata Alnus incana ssp. tenuifolia Salix spp. Viburnum edule Lonicera involucrata Rosa acicularis Rosa nutkana	SOIL NAME: Cumulic and Orthic Regosols. TEXTURE: Variable.
HERB: well-developed. Equisetum arvense Equisetum pratense Equisetum hyemale Calium triflorum Pyrola asarifolia Circaea alpina Athyrium filix-femina Sellaginella rupestris	DRAINAGE: Good to rapid. HUMUS FORM: Absent; thin Velmoders or Leptomoders. EFFECTIVE ROOTING: Deep (greater than 40 cm). OTHER FEATURES: Very thin surface organic matter accumulations.
MOSS: very poorly developed; generally absent except on decaying wood and tree bases.	

COMMENTS: This e.a. is common on floodplain islands and river bottomlands of the Skeena and Bulkley rivers and their major tributaries. A very productive ecosystem, but coniferous trees are slow to establish after disturbance because of the intense competition from shrubs and herbs.

PLOODPLAIN COTTONWOOD SERAL (IC4g3/11)

ACTIVITY OR CONCERN	
Species choice:	
Preferred	- Sx, Cw.
Acceptable	- Act, (At).
Logging:	- winter logging preferred.
Site preparation:	
Mechanical	- AVOID IF POSSIBLE. - consider only if a committed program of brush control is in place.
Prescribed fire:	- OK, but difficult due to poor distribution of slash and rapid brushing-in; timing is important.
Brush hazard:	- SEVERE (sometimes variable). - CONTROL REQUIRED; search for a cost-efficient method to re-establish a coniferous stand.
Reforestation:	- PLANT Sx IMMEDIATELY, preferrably with large plug stock.
Other comments:	- PLAN ALL TREATMENTS NECESSARY TO ENSURE "FREE GROWING" CONIFERS; timing is critical if brush is to be controlled. - search for appropriate herbicides.

8 THE ICHq4 VARIANT

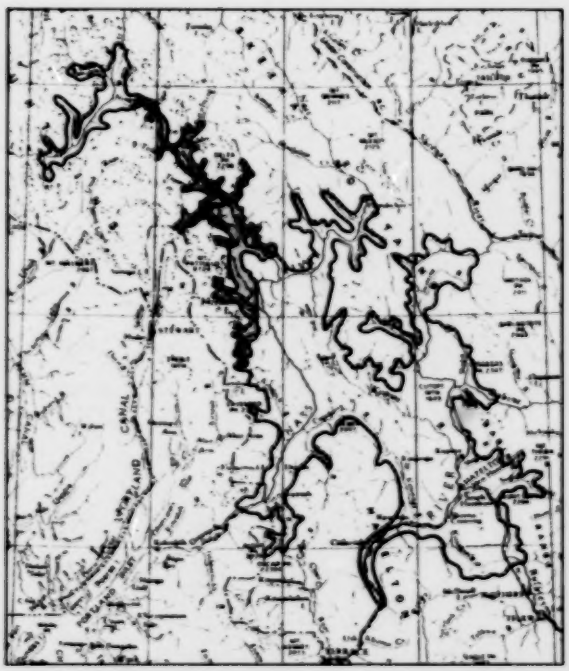


FIGURE 20. The Northwestern Transitional Interior Cedar - Hemlock Subzone, Maxladin - Bell-Irving Variant (ICHq4) in the Prince Rupert Forest Region.

8.1 Ecosystem Units of the ICHg4

/01 Zonal Hemlock - Devil's Club - Moss ecosystem association
  /01.1 Hemlock subassociation
  /01.2 Subalpine Fir subassociation
/02 Dry Hemlock - Moss ecosystem association
/03 Hemlock - Vaccinium ecosystem association
  /03.1 Hemlock subassociation
  /03.2 Subalpine Fir subassociation
/04 Devil's Club - Leafy Moss ecosystem association
  /04(a) coarse-textured phase
  /04(b) fine-textured phase
/05 Spruce - Horsetail ecosystem association
/06 Floodplain Subalpine Fir ecosystem association
/07 Slide Alder Thicket ecosystem association
/08 Wet Mountain Alder Thicket ecosystem association
/09 Sedge Wetland ecosystems

Seral ecosystem associations:

/10 Floodplain Cottonwood seral ecosystem association

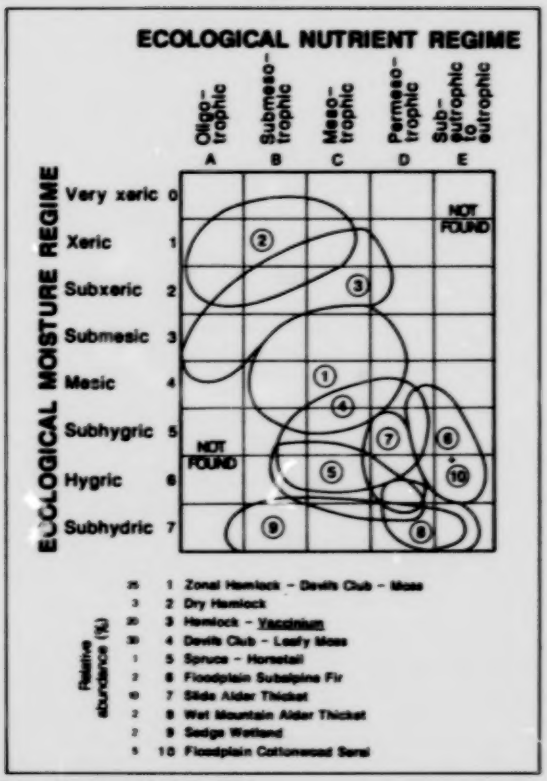


FIGURE 21. Edatopic grid of the ICHg4.

8.2 Seral Variations - ICHg4

Seral vegetation is of minor importance within the ICHg4, and typical seral tree species are virtually lacking. Trembling aspen, lodgepole pine and paper birch are rare; only black cottonwood occurs with significant frequency. It is the dominant seral species on floodplains and grows on some upland sites mixed with subalpine fir, hybrid spruce, and western hemlock. On floodplains, black cottonwood is eventually replaced by subalpine fir and hybrid spruce.

The absence of seral vegetation is probably a direct result of climatic limitations within the variant. Subalpine fir is well adapted to the cold snowy winter and trembling aspen, lodgepole pine, and paper birch are apparently unable to compete successfully under such conditions.

8.3 Key to Ecosystems of the ICHg4

A Forested ecosystems ..... B

AA Ecosystems without trees or with scattered individuals or clumps of trees ..... K

B *Vaccinium* spp. common to abundant C

C Hw dominates main canopy; middle and upper slopes, ridges ..... D

D *Oplopanax horridus* and *Gymnocarpium dryopteris* common to abundant; mesic, mesotrophic

ZONAL HEMLOCK - DEVIL'S CLUB - MOSS, HEMLOCK SUBASSOCIATION (ICHg4/01.1)

DD *Oplopanax horridus* and *Gymnocarpium dryopteris* scarce or lacking; submesic, submesotrophic

HEMLOCK - VACCINIUM, HEMLOCK SUBASSOCIATION (ICHg4/03.1)

CC Bl and Sx dominate main tree canopy; middle and lower slopes, valley bottoms ..... E

E *Oplopanax horridus* common to abundant; mesic, mesotrophic

ZONAL HEMLOCK - DEVIL'S CLUB - MOSS, SUBALPINE FIR SUBASSOCIATION (ICHg4/01.2)

EE *Oplopanax horridus* scarce or lacking; ecosystems either wetter or drier than average ..... F

F *Equisetum* spp. scarce or lacking; soils well drained

HEMLOCK - VACCINIUM, SUBALPINE FIR SUBASSOCIATION (ICHg4/03.2)

FF *Equisetum* spp. dominate herb layer; soils poorly drained (gleyed)

SPRUCE - HORSETAIL (ICHg4/05)

BB Vaccinium spp. scarce or lacking in shrub layers ..... G

C Hw dominates tree canopy; shallow (less than 50cm), rapidly drained soils on upper slopes and ridges

DRY HEMLOCK - MOSS (ICHg4/02)

CC Bl and Sx or Act dominate tree canopy; relatively deep soils on lower slopes and valley bottoms ..... H

H Shrub layer well developed; Oplopanax horridus and/or Cornus sericea dominant I

HH Shrub layer poorly developed; Oplopanax horridus and/or Cornus sericea never dominant

SPRUCE - HORSETAIL (ICHg4/05)

I Act dominates tree canopy; young floodplains

FLOODPLAIN COTTONWOOD SERAL (ICHg4/10)

II Bl and Sx dominate tree canopy ..... J

J Soils not strongly developed; floodplains

FLOODPLAIN SUBALPINE FIR (ICHg4/06)

JJ Soils strongly developed

DEVIL'S CLUB - LEAFY MOSS (ICHg4/04)

(i) Fluvial fans and terraces; sandy or gravelly soils

coarse-textured phase [ICHg4/04(a)]

(ii) Morainal or colluvial blankets; loamy and finer soils

fine-textured phase [ICHg4/04(b)]

K Alnus spp. and/or robust ferns dominant vegetation L

KK Sedges and/or Salix spp. (rather than Alnus spp. and/or robust ferns) dominant vegetation

SEDGE WETLAND (ICHg4/09)

L Alnus viridis dominant; typically on slopes

SLIDE ALDER THICKET (ICHg4/07)

LL Alnus incana dominant; typically in gullies or near creeks and lakes

WET MOUNTAIN ALDER THICKET (ICHg4/08)

8.4 Prominence of the Major Species of the ICHg4

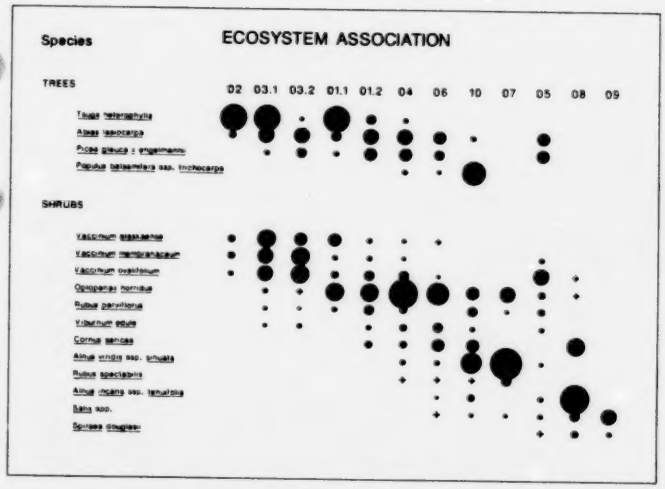
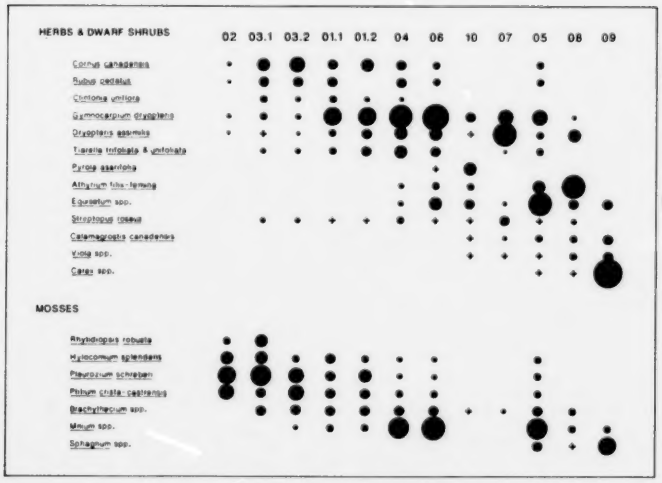
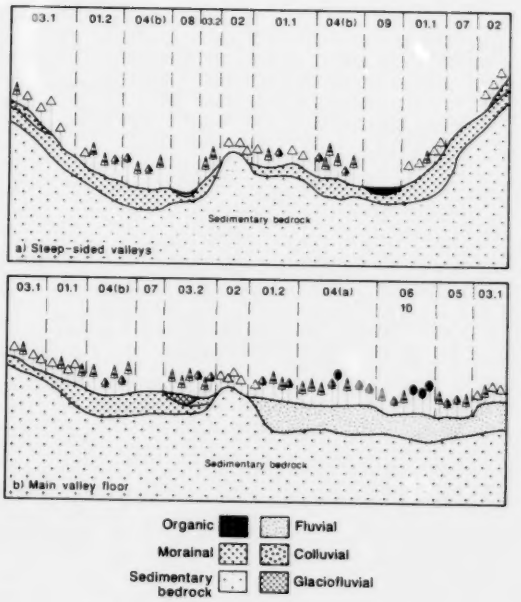


FIGURE 22. Prominence values for the major species of the ICHg4. Diameters of the circles are proportional to the prominence value, which is a measure of plant abundance incorporating frequency and cover of the species in sample plots. Prominence value = mean cover multiplied by the square root of frequency (+ = trace).

FIGURE 22. (continued)





Toposequences of ecosystems in the ICHg4

FIGURE 23. Toposequences of ecosystems in the ICHg4. Tree symbols as in Appendix 11.2.

TABLE 11. Habitat features of ecosystem units in the ICNpt

Habitat features	02	03.1	03.2	03.3	03.3	04		04
						a	b	
Slope class	level to nearly level, sloping	gently to strongly sloping	level to strongly sloping	gently to strongly sloping	gently to strongly sloping	level to nearly level, sloping	gently to nearly level, sloping	level
Slope position	slope aprons, ridges	middle and upper	terraces and valleys	middle	lower to middle, base	valleys, base, terraces	lower to middle	valley floor
Soil parent materials	BO, CV	AM, CV, BM	A, C, F, BO	A, C, BO	A, F	F	A, CLI	F
Soil texture	LS to SCL	S to L	S to L	LS to SL	SL to SCL	S to LS	LS to CL	S to SL
Drainage class	rapid	well	well	well	well	well to imperfect	well to imperfect	well to imperfect
Moisture regime	xeric	subxeric	subxeric	mesic	mesic	subhygric	subhygric	subhygric to hygric
Nutrient regime	oligo-trophic	submeso-trophic	submeso-trophic	meso-trophic	meso-trophic	permeso-trophic	permeso-trophic	permeso-trophic
Soil classification	GRV, F	GRV	GRV	BRV, FRV	BRV, DYB	GRV, DYB, F	GRV, GL	R, GL, DYB
Humus form classification	MAR, MOR	MAR	MAR	MAR, MOR	MAR	MAR, MOR	MAR, MOR	MOR
Rooting depth(cm)	<50	<40	<40	30-70	25-65	<50	<50	<50
Thickness humus layer (cm)	4-12	3-6	3-6	4-10	4-10	3-15	3-15	4-7

TABLE 11. (continued)

Habitat features	18	07	05	08	09
Slope class	level str. sloping	v. gently to str. sloping	level str. sloping	level	level
Slope position	valley floor	valleys,mid-dle to lower	valley floor	valleys,low-er to middle	valleys,low-er to middle
Soil parent materials	F	W	F	W, F	C, CW
Soil texture	S to SL	L to SCL	S to SCL	S to SCL	organic
Drainage class	well to imperfect	mod. well to imperfect	imperfect to poor	poor to very poor	poor to very poor
Moisture regime	subhygric to hygric	subhygric to hygric	hygric to subhydric	subhydric to hydric	humidic to hydric
Nutrient regime	perhum-trophic	perhum-trophic	hum-trophic	perhum-trophic	eutrophic
Soil classi-fication	B	BG, BB	GR, C, GL	C, BG, GR	FI, C
Names from classi-fication	---	---, ---	---, ---	---, ---	---, ---
Rooting depth(cm)	<50	<50	<50	<50	<50
Thickness humic layer (cm)	0-10	0-20	0-14	0-10	0-5

Abbreviations of soil parent materials: C - colluvial; CV - colluvial veneer; F - fluvial; FG - glaciofluvial; L - lacustrine; M - marginal; MV - marginal veneer; O - organic; OV - organic veneer; RK - rock outcrop.

Abbreviations of soil textures: CL - clay loam; L - loam; LS - loamy sand; S - sand; SCL - sandy clay loam; SL - sandy loam; SiL - silt loam.

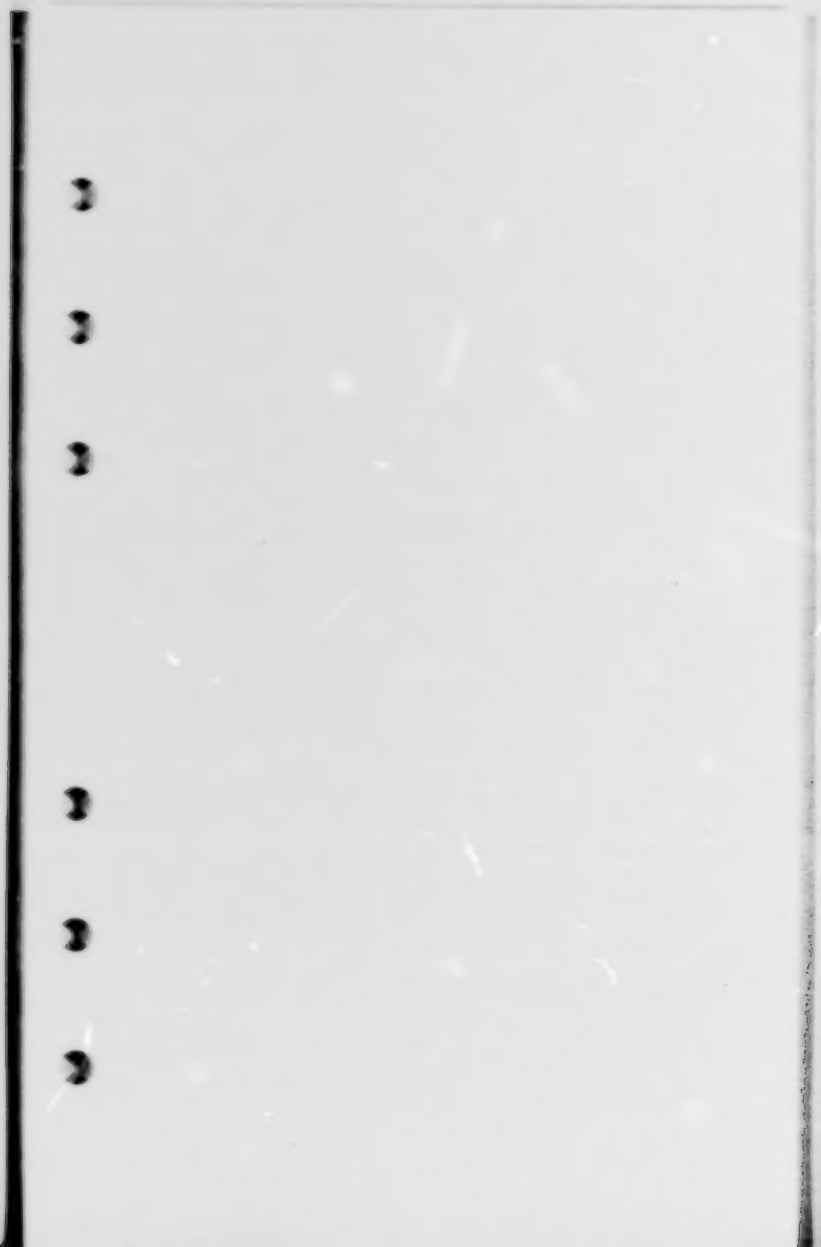
Abbreviations of soil orders/great groups: BRB - Dystric Brunisols; F - Solonetz; FHP - Ferro-Humic Podzols; FI - Fibrisols; C - Gleysols; GL - Gray Luvisols; GR - Gleyed Regosols; HPF - Humo-Ferric Podzols; RE - Eutric Cryosols; R - Regosols; RC - Dupe Cryosols; UB - Eutric Brunisols.

Abbreviations of names from classification: BAR - Basinarc, BRAN - Brachan-arch, BTAN - Bitthanarc, ECAN - Eutchanarc, HYAN - Hydranarc, KYAN - Kyhi-anarc, ORR - Orrardarc.

TABLE 12. Summary of silvicultural prescriptions and guidelines for ICHg4

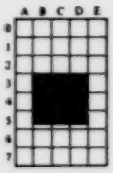
Ecosystem unit	Species choice[a] Preferred	Acceptable	Primary method of establishment	Site preparation Mech.	Burning	Brush potential
/01.1	Hw, (Bl)	(Sx)	Planting	OK	OK	Low-mod.
/01.2	Bl	Sx	Planting	AVOID	OK	Moderate
/02		(Pl) AVOID LODGING				
/03.1	Hw, (Bl)	Sx,(Pl),(Hm)	Planting (Natural)	AVOID	OK	Low
/03.2	Bl	Sx	Planting (Natural)	OK	OK	Low
/04(a)	Bl, Sx		Planting	AVOID	OK	Mod.-sev.
/04(b)	Bl	Sx	Planting	AVOID	OK	Mod.-sev.
/05	Sx	Bl	Natural or planting	AVOID	AVOID	Variable
/06	Bl, (Sx)	(Act)	Planting	AVOID	OK	Mod.-sev.
/07	NO CONIFEROUS TREE COVER					
/08	NO CONIFEROUS TREE COVER					
/09	ORGANIC WETLANDS					
/10	Act	(Sx), (Bl)	Natural	OK	AVOID	Severe

[a] Because of the suitability of subalpine fir to a cold snowy climate, it is the primary species recommended for planting. Presently, nursery culturing problems exist with subalpine fir. For the immediate future only experimental plantings of subalpine fir will be conducted. Until subalpine fir nursery cultivation concerns have been overcome, only spruce and hemlock will be considered for the bulk of operational planting (G.D. Lloyd, pers. comm., Feb. 1987).



8.5 Description and Interpretation of Ecosystem Units of the ICHg4

ZONAL HEMLOCK - DEVIL'S CLUB - MOSS,
HEMLOCK SUBASSOCIATION (ICHg4/01.1)



SLOPE POSITIONS: Middle slopes.

SLOPE RANGE: Gently to strongly sloping.

ASPECT: All.

VEGETATION LAYER [1]	SOILS
TREE: trees large; stands well-stocked. Hw (Bl) (Sx)	TERRAIN/PARENT MATERIALS: Morainal and colluvial blankets; glaciofluvial terraces.
SHRUB: moderately well-developed. Oplopanax horridus Vaccinium alaskaense (Vaccinium ovalifolium) (Vaccinium membranaceum)	SOIL NAME: Orthic Humo-Ferric and Ferro-Humic Podzols.
	TEXTURE: Loamy sand to sandy loam.
	DRAINAGE: Good.
HERB: moderately well-developed. Gymnocarpium dryopteris Rubus pedatus Cornus canadensis Dryopteris assimilis (Clintonia uniflora) (Tiarella unifoliata)	HUMUS FORM: Hemimors; Hemihumimors.
	EFFECTIVE ROOTING: Variable (20-70cm).
MOSS: moderately well-developed; often continuous cover. Brachythecium spp. (Rylocomium splendens) (Pleurozium schreberi) (Ptilium crista-castrensis)	OTHER FEATURES: Subsurface mineral horizons often have an abundance of coarse fragments.

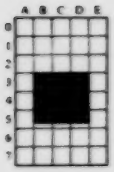
COMMENTS: This subassociation, characterized by a mixture of Oplopanax horridus and Vaccinium spp. in the shrub layer, represents the climatic climax for the ICHg4. The dominance of hemlock reflects middle slope positions unaffected by cold air pooling in the valley bottom.

[1] Parentheses indicate species that may have low cover values or may not be consistently present.

ZONAL HEMLOCK - DEVIL'S CLUB - MOSS, HEMLOCK SUBASSOCIATION (ICHg4/01.1)

ACTIVITY OR CONCERN	
Species choice:	
Preferred	- Hw, (Bl).
Acceptable	- (Sx).
Logging:	- no preference as to season.
Site preparation:	
Mechanical	- probably OK, although thin humus layers are not suitable.
Prescribed fire	- OK on most sites; when humus layer is > 15cm productivity will be improved.
Brush hazard:	- low to moderate. - thimbleberry, raspberry and Vaccinium spp. may be problem.
Reforestation:	- if advanced Hw regeneration is unacceptable plant with large Bl stock.
Other comments:	- spruce may be damaged by heavy snows, and may not survive spruce weevil attack.

ZONAL HEMLOCK - DEVIL'S CLUB - MOSS, SUBALPINE FIR SUBASSOCIATION (ICHg4/01.2)



SLOPE POSITIONS: Valley floors, middle and lower slopes.

SLOPE RANGE: Gently to strongly sloping.

ASPECT: All.

VEGETATION LAYER

TREE: trees large but stand poorly stocked.
Bl
Sx
(Hw)

SHRUB: moderately well-developed.
Oplopanax horridus
(Vaccinium ovalifolium)
(Vaccinium membranaceum)
(Rubus parviflorus)

HERB: well-developed, low diversity.
Gymnocarpium dryopteris
Rubus pedatus
Cornus canadensis
Dryopteris assimilis
Tiarella trifoliata

MOSS: moderately well developed; often continuous.
Ptilium crista-castrensis
(Pleurozium schreberi)
(Brachythecium spp.)
(Rhytidiadelphus triquetrus)

SOILS

TERRAIN/PARENT MATERIALS:
Morainal blankets and fluvial fans.

SOIL NAME:
Orthic Humo-Ferric Podzols; Orthic Dystric Brunisols.

TEXTURE:
Sandy loam to silt loam.

DRAINAGE:
Good.

HUMUS FORM:
Mesomors.

EFFECTIVE ROOTING:
Shallow to moderately deep.

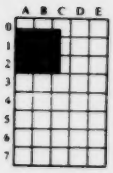
OTHER FEATURES:
Subsurface mineral horizons may have a high proportion of coarse fragments, although the soil matrix itself may be relatively fine.

COMMENTS: This subassociation, dominated by subalpine fir, is found on portions of the landscape subject to cold air drainage. It is common within the main Bell-Irving River valley.

ZONAL HEMLOCK - DEVIL'S CLUB - MOSS, SUBALPINE FIR SUBASSOCIATION (ICHg4/01.2)

ACTIVITY OR CONCERN	
Species choice:	
Preferred	- Bl.
Acceptable	- Sx.
Logging:	- late summer or winter.
Site preparation:	
Mechanical	- AVOID disturbance of fine-textured soils, may promote brush competition.
Prescribed fire	- OK on most sites; when humus layer is > 15cm productivity will be improved.
Brush hazard:	- moderate. - thimbleberry, highbush-cranberry, raspberry and Vaccinium spp. may be problem species.
Reforestation:	- ASSESS DURING FIRST SURVIVAL SURVEY. - advance Bl regeneration may be acceptable, otherwise plant large Bl stock.
Other comments:	- spruce may be damaged by heavy snows and/or weevil attacks. - fine-textured soils may be prone to erosion and compaction (on steep slopes).

DRY HEMLOCK - MOSS (ICHg4/02)



SLOPE POSITIONS: Slopes apices and ridge crests.

SLOPE RANGE: Level (on ridge tops) to extremely sloping.

ASPECT: All.

VEGETATION LAYER

SOILS

TREE: trees often scrubby and low; poor stocking or in dense patches.
Hw
(Bl)
(Pl)

SHRUB: poorly developed.
(Vaccinium membranaceum)
(Vaccinium alaskaense)
(Vaccinium ovalifolium)

HERB: very sparse (sometimes only a few individuals).
(Orthilia secunda)
(Linnaea borealis)
(Chimaphila umbellata)

MOSS: usually continuous, but may be patchy under dense tree cover.
Pleurozium schreberi
Ptilium crista-castrensis
Hylocomium splendens
(Barbilophozia spp.)
(Dicranum spp.)
(Peltigera aphthosa)

TERRAIN/PARENT MATERIALS:
Rock outcrops; very thin colluvial veneers.

SOIL NAME:
Orthic Humo-Ferric Podzols; Typic Folisols

TEXTURE:
Loamy sand to silt loam (soil often completely lacking).

DRAINAGE:
Rapid.

HUMUS FORM:
Hemimors; Hemihumimors.

EFFECTIVE ROOTING:
Very shallow (<40cm).

OTHER FEATURES:
Root restricting layer at <100cm; trees often growing in a layer of cobbly colluvial fragments.

COMMENTS: This association is the driest within the ICHg4, restricted to rock outcrops and the upper slopes adjacent to them. Commercial timber production is non-viable. The shrub layer is typically dominated by coniferous regeneration, with Vaccinium spp. often scarce.

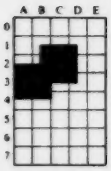
DRY HEMLOCK - MOSS (ICHg4/02)

ACTIVITY OR CONCERN

AVOID LOGGING

These ecosystems should not be logged unless absolutely necessary - bedrock exposure is usually close to the soil surface. If logged promote establishment of Pl.

HEMLOCK - VACCINIUM, HEMLOCK SUBASSOCIATION (ICHg4/03.1)



SLOPE POSITION: Middle and upper slopes to ridges.

SLOPE RANGE: Very gently to very strongly sloping.

ASPECT: All.

VEGETATION LAYER

TREE: large, mature trees;stand well-stocked.
- Hw
- (Bl)
- (Hm)
- (Sx)

SHRUB: well-developed.
- Vaccinium alaskaense
- Vaccinium ovalifolium
- Vaccinium membranaceum

HERB: poorly developed.
- Cornus canadensis
- Rubus pedatus
- (Orthilia secunda)
- (Clintonia uniflora)

MOSS: well-developed continuous carpet dominated by feathermosses.
- Pleurozium schreberi
- Hylocomium splendens
- Ptilium crista-castrensis
- (Rhytidiopsis robusta)
- (Brachythecium spp.)

SOILS

TERRAIN/PARENT MATERIAL:
Morainal and colluvial veneers over rock; glaciofluvial terraces.

SOIL NAME:
Orthic Humo-Ferric Podzols.

TEXTURE:
Sand to loam.

DRAINAGE:
Good.

HUMUS FORM:
Hemimors.

EFFECTIVE ROOTING:
Shallow (<40cm).

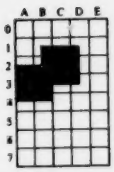
OTHER FEATURES:
Coarse fragment content often high.

COMMENTS: This ecosystem association is often characterized by a dense hemlock canopy and significant hemlock regeneration. Towards the upper elevational limits of the variant, mountain hemlock may constitute up to half of the tree layer.

HEMLOCK - VACCINIUM, HEMLOCK SUBASSOCIATION (ICHg4/03.1)

ACTIVITY OR CONCERN	
Species choice:	
Preferred	- Hw, (Bl).
Acceptable	- Sx, (Pl), (Hm).
Logging:	- summer or winter.
Site preparation:	
Mechanical	- light mixing of humus with mineral soil may improve productivity, OTHERWISE AVOID. - in areas with inclusions of shallow to bedrock AVOID.
Prescribed fire	- OK if humus > 10cm, need hot fire. - AVOID if < 50cm of mineral soil to bedrock.
Brush hazard:	- low, may be localized problem in depressions.
Reforestation:	- advance regeneration of Hw or Bl may be acceptable; otherwise plant Hw.
Other comments:	- if dwarf mistletoe is present then burn and plant Hw. - if dwarf mistletoe is absent then natural regeneration is a viable option. - Hm is acceptable at higher elevations.

HEMLOCK - VACCINIUM, SUBALPINE FIR SUBASSOCIATION (ICHg4/03.2)



SLOPE POSITIONS: Terraces; ridges and knolls in valley bottom.

SLOPE RANGE: Level to very strongly sloping.

ASPECT: All.

VEGETATION LAYER

TREE: large trees in an open poorly stocked stand.
Bl
(Sx)

SHRUB: well-developed.
Vaccinium ovalifolium
Vaccinium membranaceum
(Vaccinium alaskaense)
(Sorbus spp.)

HERB: poorly developed.
Cornus canadensis
Rubus pedatus
(Tiarella unifoliata)
(Streptopus roseus)
(Orthilia secunda)

MOSS: well-developed, often patchy.
Pleurozium schreberi
(Ptilium crista-castrensis)
(Barbilophozia spp.)
(Brachythecium spp.)

SOILS

TERRAIN/PARENT MATERIALS:
Morainal and colluvial blankets; occasional fluvial and glaciofluvial terraces.

SOIL NAME:
Orthic Humo-Ferric Podzols.

TEXTURE:
Sand to loam.

DRAINAGE:
Good.

HUMUS FORM:
Hemimors.

EFFECTIVE ROOTING:
Shallow (<40cm).

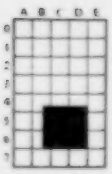
OTHER FEATURES:
Coarse fragment content may be high.

COMMENTS: Although the tree canopy of this association is typically open, subalpine fir regeneration forms a large part of the shrub layer (24%). The predominance of subalpine fir is also a reflection of the influence of cold air.

HEMLOCK - VACCINIUM, SUBALPINE FIR SUBASSOCIATION (ICHg4/03.2)

ACTIVITY OR CONCERN	
Species selection:	
Preferred	- Bl.
Acceptable	- Sx.
Logging:	- summer or winter.
Site preparation:	
Mechanical	- light mixing of humus with mineral soil may improve productivity. - AVOID areas with thin humus layer.
Prescribed fire:	- OK if humus thickness is > 10cm, need hot fire. - AVOID if < 50cm of mineral soil over bedrock.
Brush hazard:	- low.
Reforestation:	- advance Bl regeneration may be suitable; if not plant large Bl stock.
Other comments:	- dominance of subalpine fir is a response to cold air drainage and pooling on the valley bottom sites. - Hw will probably not succeed if planted.

DEVIL'S CLUB - LEAFY MOSS (ICHg4/04)



SLOPE POSITIONS: Valley floor, terraces and fans (a); lower to middle slopes (b).

SLOPE RANGE: Level to moderately sloping (a); very gently to extremely sloping (b).

ASPECT: Flat (a); all (b).

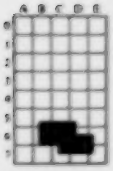
VEGETATION LAYER	SOIL Coarse-text. phase ICHg4/04(a)	 Fine-text. phase ICHg4/04(b)
TREE: large trees, poorly stocked stands. Bl (Sx)	**TERRAIN/PARENT MATERIALS:** Fluvial fans and terraces.	Morainal blankets with occasional lacustrine.
SHRUB: well-developed. Oplopanax horridus (Vaccinium ovalifolium) (Viburnum edule) (Cornus sericea)	**SOIL NAME:** Orthic Humo-Ferric Podzols; Regosols.	Orthic Humo-Ferric Podzols; Orthic Grey Luvisols.
HERB: well-developed and diverse. Gymnocarpium dryopteris Dryopteris austriaca Tiarella unifoliata Tiarella trifoliata Rubus pedatus Streptopus roseus (Cornus canadensis)	**TEXTURE:** Sand to loamy sand.	Sandy loam to clay loam.
	DRAINAGE: Good to imperfect.	Good to imperfect.
	HUMUS FORM: Hemimors; Hemi-humimors.	Hemimors; Mormoders.
MOSS: moderately well developed and patchy. Mnium spp. (Brachythecium spp.)	**EFFECTIVE ROOTING:** Deep (<90cm).	Moderately deep (<60cm).

COMMENTS: The coarse-textured phase of this ecosystem association exhibits better spruce canopy coverage and productivity than the fine-textured phase. This association appears similar to 01, but is differentiated by the dominance of Oplopanax horridus and virtual absence of Vaccinium spp.

DEVIL'S CLUB - LEAFY MOSS (ICHg4/04)

ACTIVITY OR CONCERN	Coarse-textured phase ICHg4/04(a)	Fine-textured phase ICHg4/04(b)
Species choice:		
Preferred	- Bl, Sx.	- Bl.
Acceptable		- Sx.
Logging:	- late summer or winter.	- winter to reduce soil compaction.
Site preparation:		
Mechanical	- AVOID because of relatively high brush hazard.	- AVOID to reduce risk of soil compaction and brush competition.
Prescribed fire	- hot fires acceptable if humus layer thick enough (humus layer provides much of nutrient source). - burn inclusions of Slide Alder Thicket (07).	
Brush hazard:	- moderate to severe; alder, thimbleberry, red-osier dogwood and highbush-cranberry are potential problem species (indications are that when burning occurs thimbleberry will be a major problem).	
Reforestation:	- advance regeneration of Bl may be acceptable; plant large stock to bring up to stocking standard.	
Other comments:	- Sx is prone to snow damage but has excellent productivity when mature. - selection of proper provenance for spruce stock is critical.	

SPRUCE - HORSETAIL (ICHg4/05)



SLOPE POSITIONS: Valley floors.

SLOPE RANGE: Level.

ASPECT: Flat.

VEGETATION LAYER

SOIL

TREE: large trees but poorly stocked and sparse.
Sx
Bl

SHRUB: moderately well-developed, but often sparse and/ or patchy.
Vaccinium vitalifolium
(Oplopanax horridum)
(Salix spp.)

HERB: well-developed and diverse.
Equisetum spp.
Cryptocarpium dryopteris
Athyrium filix-femina
(Cornus canadensis)
(Rubus pedatus)
(Gymnocarpium oregonense)
(Calamagrostis canadensis)

MOSS: well-developed but usually patchy.
Mnium spp.
Brachythecium spp.
(Ptilium crista-castrensis)
(Sphagnum spp.)

TERRAIN/PARENT MATERIAL:
Fluvial fans and fluvial level.

SOIL NAME:
Gleyed Regosols; Orthic Gleysols; Gleyed Grey Luvisols.

TEXTURE:
Sand to sandy clay loam.

DRAINAGE:
Imperfect to poor.

WATER FORM:
Seepage; Semihumicors.

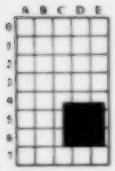
EFFECTIVE ROOTING:
Shallow (<40cm).

OTHER FEATURES:
A fluctuating water table is typical (often near the surface); roots are often concentrated in the surface organic layers.

COMMENTS: This ecosystem association has a limited distribution within the ICHg4, being restricted to the margins of swamps, wetlands, and lakes.

SPRUCE - HORSETAIL (SCSp4/05)

ACTIVITY OR CONCERN	
Species choice:	
Preferred	- Sx.
Acceptable	- Bl.
Site preparation:	
Mechanical	- AVOID, seasonally high water table.
Prescribed fire	- AVOID, unless heavy slash load.
Brush hazard:	- variable, low to severe; alder and willow are potential problem species.
Reforestation:	- FULL PLANT with Sx on mounds, advance regeneration of Bl may be acceptable.
Other comments:	- very open poorly stocked stands with minimal extent. - all coniferous regeneration should to be accepted. - due to possible brush problem and silvicultural limitations consider management options carefully in advance.



FLOODPLAIN SUBALPINE FIR (ICHg4/06)

SLOPE POSITIONS: Valley floors.

SLOPE RANGE: Level.

ASPECT: Flat.

VEGETATION LAYER

SOIL

TREE: large trees, widely spaced.
B1
(Sx)
(Act)

SHRUB: well-developed, often patchy.
Oplopanax horridus
Ribes lacustre
(Cornus sericea)
(Viburnum edule)

HERB: well-developed and diverse.
Gymnocarpium dryopteris
Dryopteris assimilis
Tiarella trifoliata
Equisetum spp.
(Cornus canadensis)
(Athyrium filix-femina)
(Rubus pedatus)

MOSS: well-developed, dominated by leafy mosses.
Mnium spp.
(Brachythecium spp.)
(Ptilium crista-castrensis)

TERRAIN/PARENT MATERIALS:
Fluvial level (floodplain).

SOIL NAME:
Regosols; Orthic Grey Luvisols; Orthic Dystric Brunisols.

TEXTURE:
Sand to sandy loam.

DRAINAGE:
Good to imperfect.

HUMUS FORM:
Hemimors.

EFFECTIVE ROOTING:
Shallow (<30cm).

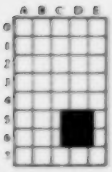
OTHER FEATURES:
Roots often concentrated in the surface organic horizons.

COMMENTS: This ecosystem association is nearly identical to 04 in terms of species composition and cover values. The key difference is its location on floodplains.

FLOODPLAIN SUBALPINE FIR (ICHg4/06)

ACTIVITY OR CONCERN	
Species choice:	
Preferred	- Bl, (Sx).
Acceptable	- (Act).
Logging:	- winter.
Site preparation:	
Mechanical	- AVOID if possible, humus layer very thin.
Prescribed fire	- OK but slash may be insufficient; timing is critical. - fire may be required to reduce brush hazard.
Brush hazard:	- moderate to severe; red-osier dogwood, alder, cottonwood, willow, and highbush-cranberry are potential problem species.
Reforestation:	- plant Bl unless advanced regeneration is suitable. - Sx will do well, if able to withstand snow and temperature conditions.
Other comments:	- timing of planting is critical to ensure conifers are free-growing. - Act is acceptable only if managed as pure stand and as natural regeneration.

SLIDE ALDER THICKET (1CNg4/07)



SLOPE POSITIONS: Valley floors; lower to middle slopes.

SLOPE RANGE: Very gently to very strongly sloping.

VEGETATION LAYER

SOIL

TREE: completely lacking.

SHRUB: very well-developed, usually continuous.
Alnus viridis ssp. sinuata
Oplopanax horridus
(Sambucus racemosa)
(Rubus spectabilis)

HERB: very well-developed, but typically composed of a few dominant species.
Athyrium filix-femina
Dryopteris assimilis
Gymnocarpium dryopteris
(Streptopus roseus)
(Streptopus amplexifolius)

MOSS: virtually lacking, represented by very occasional occurrence of Mnium spp. and Brachythecium spp.

TERRAIN/PARENT MATERIALS:
Morainal blankets (often gullied).

SOIL NAME:
Humic Gleysols; Orthic Sombric Brunisols.

TEXTURE:
Loam to silt loam.

DRAINAGE:
Moderately good to imperfect.

HUMUS FORM:
Mesimors; Mesihumimors.

EFFECTIVE ROOTING:
Shallow (<25cm).

OTHER FEATURES:
Subsurface seepage is prevalent; thick turfy humus layers are common.

COMMENTS: It is not clear how units of this association are formed. They may develop after small fires or blowdown. Because of the rapid colonization by shrubs and herbs, coniferous trees are unable to establish.

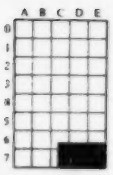
SLIDE ALDER THICKET (ICNq4/07)

ACTIVITY OR CONCERN

NO CONIFEROUS TREES PRESENT.

Can be rehabilitated by mechanical clearing and use of herbicides and/or burning; should be cleared if part of a forested matrix. These are usually highly productive sites; if cleared plant Bl or Sx.

WET MOUNTAIN ALDER THICKET (ICHg4/08)



SLOPE POSITIONS: Valley floors; lower and middle slopes (gullied and depressions).

SLOPE RANGE: Level.

ASPECT: Flat.

VEGETATION LAYER

TREE: absent, although alder may occasionally attain a height > 10m.

SHRUB: very well-developed; thick and continuous.
Alnus incana ssp. tenuifolia
Salix spp.
(Cornus sericea)
(Sambucus racemosa)

HERB: well-developed and diverse.
Athyrium filix-femina
Equisetum spp.
Viola spp.
(Dryopteris assimilis)
(Calamagrostis canadensis)
(Urtica dioica)

MOSS: very sparse.
(Brachythecium spp.)
(Mnium spp.)

SOIL

TERRAIN/PARENT MATERIAL:
Fluvial and morainal blankets.

SOIL NAME:
Orthic Gleysols; Rego Gleysols; Gleyed Regosols.

TEXTURE:
Sand to clay loam.

DRAINAGE:
Poor to very poor.

HUMUS FORM:
Hydromors; Hydromoders.

EFFECTIVE ROOTING:
Very shallow (<10cm).

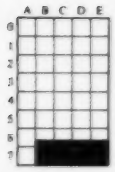
OTHER FEATURES:
Surface humus layers are usually quite thick.

COMMENTS: This ecosystem association occurs in poorly drained gullies, depressions and adjacent to creeks and lakes. The presence of a permanently high water table makes these units unsuitable for commercial tree production. West and east of Mt. Bell-Irving, Lysichiton americanum may be locally abundant in this unit.

WET MOUNTAIN ALDER THICKET (ICHg4/08)

ACTIVITY OR CONCERN
NO POTENTIAL FOR COMMERCIAL TREE PRODUCTION. DO NOT DISTURB, HIGH WATER TABLE.

SEDGE WETLAND (ICHg4/09)



SLOPE POSITIONS: Valley floors; lower and middle slopes.

SLOPE RANGE: Level.

ASPECT: Flat.

VEGETATION LAYER

TREE: absent except for occasional stunted individuals.

SHRUB: highly variable, scattered to continuous cover.
(Salix spp.)
(Spiraea douglasii)

HERB: very well-developed; usually low diversity.
Carex spp.
Calamagrostis canadensis
Viola spp.
(Equisetum spp.)
(Senecio triangularis)
(Potentilla palustris)

MOSS: moderately well-developed.
Sphagnum spp.
(Calliergon spp.)

SOIL

TERRAIN/PARENT MATERIAL:
Organic blankets and organic veneers over fluvial and morainal blankets.

SOIL NAME:
Gleysols; Fibrisols.

TEXTURE:
Sandy loam to clay.

DRAINAGE:
Poor to very poor.

HUMUS FORM:
Histimoders; Histimors.

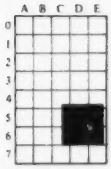
OTHER FEATURES:
Organic soils exhibit very low levels of decomposition.

COMMENTS: Wetlands in the ICHg4 exhibit considerable diversity in overall appearance depending on landscape position. They may be dominated by Carex spp. or Salix spp. but are never forested.

SEDGE WETLAND (ICHg4/09)

ACTIVITY OR CONCERN
ORGANIC WETLANDS, NO POTENTIAL FOR COMMERCIAL TREE PRODUCTION.

FLOODPLAIN COTTONWOOD SERAL (ICHg4/10)



SLOPE POSITIONS: Valley floors.

SLOPE RANGE: Level.

ASPECT: Flat.

VEGETATION LAYER

TREE: very large trees, poorly stocked stands.
Act
(Bl)
(Sx)

SHRUB: very well-developed.
Alnus viridis ssp. sinuata
Cornus sericea
Oplopanax horridus
(Rubus parviflorus)
(Rubus idaeus)

HERB: moderately well-developed.
Pyrola asarifolia
Equisetum spp.
(Gymnocarpium dryopteris)
(Athyrium filix-femina)
(Orthilia secunda)

MOSS: absent.

SOIL

TERRAIN/PARENT MATERIAL:
Fluvial level.

SOIL NAME:
Cumulic Regosols; Orthic Regosols.

TEXTURE:
Sand to sandy loam.

DRAINAGE:
Good to imperfect.

HUMUS FORM:
Hemimors.

EFFECTIVE ROOTING:
Deep (<90cm).

OTHER FEATURES:
Litter and humus layers are usually very thin and poorly decomposed.

COMMENTS: This ecosystem association will eventually be replaced by the Floodplain Subalpine Fir unit, if undisturbed by flooding. The shrub layer, exhibiting considerable diversity, may be dominated by any of the above-mentioned species.

FLOODPLAIN COTTONWOOD SERAL (ICHg4/10)

ACTIVITY OR CONCERN
NOT LIKELY TO BE LOGGED IN PRESENT CONDITION. If logging does occur it should be conducted in a manner to promote natural regeneration of Act. See Table 12 (page 144) for summary of prescription.

1

1

1

1

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9 THE IDHg5 VARIANT

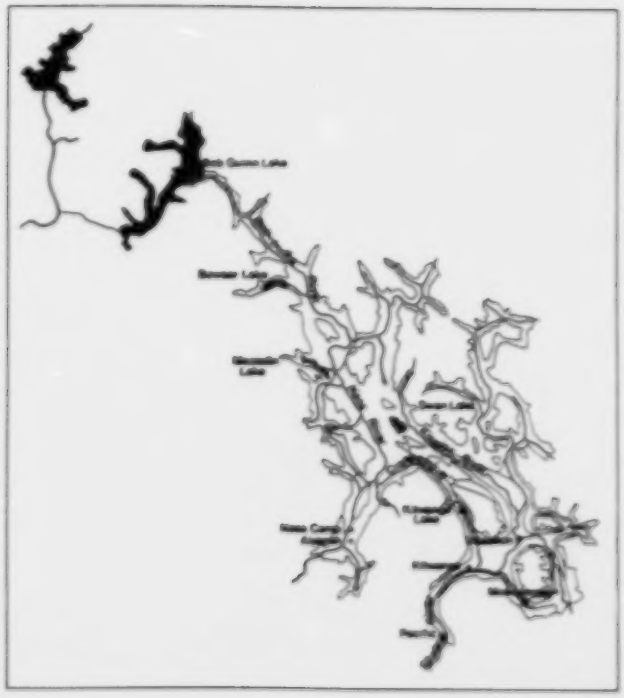

FIGURE 20. The Northwestern Transitional Interior Cedar - Hemlock Subzone, Ismut - Skeena Variant (IDHg5) in the Prince Rupert Forest Region.

The IDeg5 variant has been little sampled and studied. The IDeg5 appears to have ecosystem associations similar to those of the IDeg1. Consequently, the IDeg1 should be used as required for site identification. The IDeg5 is more similar to the IDeg1 in terms of its ecosystems than to the IDeg4.

Western hemlock is the climax species and large areas of old-growth hemlock forests are present. The western hemlock - Vaccinium spp. - moss association is common on zonal sites. Subalpine fir and hybrid spruce occupy the lower slopes and valley bottoms on subhygric to hygric sites. Oplopanax horridus and Gymnocarpium dryopteris dominate the understory layers on these sites.

Drier associations such as the Dry Hemlock - Moss and Pine - Lichen are uncommon. Where they do occur, it is usually on steep, rocky, colluvial slopes or rock bluffs. Seral ecosystems are scattered and generally not common. The area around Bob Quinn Lake probably has the highest concentration of seral ecosystems. Seral forests are a mixture of lodgepole pine, aspen, and paper birch.

10 LITERATURE CITED

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Hamilton, S., J. Pojar, G.W. Geisler, D. Vole, and K.W. Annas. 1985. A guide to the Interior Cedar - Hemlock Zone, Northwestern transitional subzone (ICHg), in the Prince Rupert Forest Region, British Columbia. Min. For., Land Manage. Rep. No. 25.

11 APPENDICES

Appendix 11.1 List of Plant Names Used in the Guide

TREES:

Abies amabilis	amabilis fir
Abies lasiocarpa	subalpine fir
Alnus rubra	red alder
Picea glauca	white spruce
Picea glauca x engelmannii	hybrid white spruce
Picea mariana	black spruce
Picea sitchensis	Sitka spruce
Picea sitchensis x glauca (=P. x lutzii)	Roche spruce
Pinus contorta var. latifolia	lodgepole pine
Populus balsamifera ssp. trichocarpa	black cottonwood
Populus tremuloides	trembling aspen
Thuja plicata	western redcedar
Tsuga heterophylla	western hemlock

SHRUBS:

Acer glabrum	Douglas maple
Alnus incana ssp. tenuifolia	mountain alder
Alnus viridis ssp. sinuata	Sitka alder
Amelanchier alnifolia	Saskatoon
Andromeda polifolia	bog-rosemary
Artemisia arctica	mountain sage
Betula glandulosa	scrub birch
Cornus sericea	red-osier dogwood

SHRUBS: (cont'd)

Corylus cornuta	hazelnut
Juniperus scopulorum	Rocky Mountain juniper
Kalmia microphylla ssp. occidentalis	bog-laurel
Ledum groenlandicum	Labrador tea
Lonicera involucrata	black twinberry
Menziesia ferruginea	false azalea
Oplopanax horridus	devil's club
Paxistima myrsinites	falsebox
Ribes lacustre	black gooseberry
Rosa acicularis	prickly rose
Rosa nutkana	Nootka rose
Rubus parviflorus	thimbleberry
Rubus spectabilis	salmonberry
Salix scouleriana	Scouler's willow
Salix spp.	willow
Shepherdia canadensis	soopolallie
Spiraea douglasii	hardhack
Symphoricarpos albus	common snowberry
Vaccinium alaskaense	Alaskan blueberry
Vaccinium caespitosum	dwarf blueberry
Vaccinium membranaceum	black huckleberry
Vaccinium ovalifolium	oval-leaved blueberry
Vaccinium parvifolium	red huckleberry
Viburnum edule	highbush-cranberry

HERBS:

Aralia nudicaulis	wild sarsaparilla	1
Arctostaphylos uva-ursi	kinnikinnick	
Arnica cordifolia	heart-leaved arnica	
Aruncus dioicus	goat's-beard	1
Athyrium filix-femina	lady fern	
Carex disperma	soft-leaved sedge	
Carex spp.	sedge	
Cassiope mertensiana	white mountain-heather	1
Chimaphila umbellata	prince's pine	
Circaea alpina	enchanter's nightshade	
Clintonia uniflora	queen's cup	
Cornus canadensis	bunchberry	
Dryopteris assimilis	spiny wood fern	
Equisetum arvense	common horsetail	
Equisetum fluviatile	swamp horsetail	
Equisetum hyemale	scouring-rush	
Equisetum pratense	meadow horsetail	
Equisetum sylvaticum	wood horsetail	
Festuca occidentalis	western fescue	
Fragaria virginiana	wild strawberry	1
Galium boreale	northern bedstraw	
Galium triflorum	sweet-scented bedstraw	
Gaultheria hispidula	creeping snowberry	
Goodyera oblongifolia	rattlesnake-plantain	1
Gymnocarpium dryopteris	oak fern	

1

HERBS: (cont'd)

Hieracium albiflorum	white-flowered hawkweed
Lathyrus nevadensis	purple peavine
Linnaea borealis	twinflower
Lycopodium annotinum	stiff club-moss
Lysichiton americanum	skunk cabbage
Melampyrum lineare	cow-wheat
Menyanthes trifoliata	buckbean
Mitella nuda	common mitrewort
Moneses uniflora	single delight
Orthilia secunda	one-sided wintergreen
Oryzopsis asperifolia	rough-leaved ricegrass
Oryzopsis pungens	short-awned ricegrass
Osmorhiza chilensis	mountain sweet-cicely
Petasites palmatus	palmate colt's-foot
Phyllodoce empetriformis	pink mountain-heather
Platanthera orbiculata	round-leaved rein-orchid
Pteridium aquilinum	bracken
Pyrola asarifolia	pink wintergreen
Pyrola chlorantha	green wintergreen
Rubus pedatus	five-leaved bramble
Rubus pubescens	trailing raspberry
Senecio triangularis	arrowleaved groundsel
Smilacina racemosa	false Solomon's-seal
Smilacina stellata	star-flowered false Solomon's-seal
Streptopus amplexifolius	clasping twistestalk

HERBS: (cont'd)		
Streptopus roseus	rosy twistedstalk	1
Streptopus streptopoides	small twistedstalk	
Tiarella trifoliata	three-leaved foamflower	
Tiarella unifoliata	one-leaved foamflower	
Vaccinium oxycoccos	bog cranberry	1
Veratrum viride	Indian hellebore	
MOSSES, LICHENS, AND LIVERWORTS:		
Aulacomnium palustre	glow moss	1
Barbilophozia lycopodioides	common leafy liverwort	
Brachythecium albicans	lawn moss	
Cladina rangiferina	reindeer lichen	
Cladonia spp.	lichens	
Hylocomium splendens	step moss	
Hypnum circinale	moss	
Mnium spp.	leafy mosses	
Peltigera canina	dog lichen	
Plagiochila porelloides	liverwort	
Pleurozium schreberi	red-stemmed feathermoss	
Polytrichum juniperinum	juniper haircap moss	
Ptilium crista-castrensis	knight's plume feathermoss	1
Rhytidiadelphus loreus	lanky moss	
Rhytidiadelphus triquetrus	electrified cat's-tail moss	
Rhytidiopsis robusta	pipecleaner moss	
Scapania bolanderi	liverwort	1
Sphagnum spp.	sphagnum or peat moss	
Stereocaulon spp.	lichens	
Tomenthypnum nitens	golden fuzzy fern moss	
		1

Appendix 11.2 Tree Symbols

TREE SYMBOLS

Ba	Amabilis fir	
Bl	Subalpine fir	
Hw	Western hemlock	
Cw	Western redcedar	
Sb	Black spruce	
Sx	Hybrid spruce	
Pl	Lodgepole pine	
Ep	Paper birch	
Act	Black cottonwood	
At	Trembling aspen	

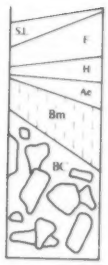
Appendix 11.3 Characteristic Soils of the ICHg

Included here are example soil profiles with written descriptions for the most commonly occurring soils of the subzone. For more detailed information and descriptions of other soils consult A Guide to the Interior Cedar - Hemlock Zone, Northwestern Transitional Subzone (ICHg) in the Prince Rupert Forest Region, British Columbia (Haeussler et al. 1985). Soil symbols and names follow The Canadian System of Soil Classification (CSSC 1978). The soil descriptions are presented as follows:

ORDER	SUBGROUP	
	Symbol	Soil Name
BRUNISOLIC	E.DYB	Eluviated Dystric Brunisol
	O.DYB	Orthic Dystric Brunisol
	O.EB	Orthic Eutric Brunisol
GLEYSOLIC	O.G	Orthic Gleysol
	R.G	Rego Gleysol
	O.HG	Orthic Humic Gleysol
LUVISOLIC	BR.GL	Brunisolic Gray Luvisol
	O.GL	Orthic Gray Luvisol
	PZ.GL	Podzolic Gray Luvisol
ORGANIC	TY.FO	Typic Folisol
	TY.M	Typic Mesisol
PODZOLIC	O.FHP	Orthic Ferro-Humic Podzol
	O.HFP	Orthic Humo-Ferric Podzol
REGOSOLIC	O.R	Orthic Regosol

In the descriptions, horizons in brackets are not always present.

ELUVIATED DYSTRIC BRUNISOL (E.DYB)



HORIZON	DESCRIPTION
S,L	- moss layer and discontinuous loose litter; undecomposed.
F	- slightly to moderately decomposed organic horizon; brown to dark brown; matted.
H	- well-decomposed organic horizon; black; abundant medium, coarse roots.
Ae	- pale brown; loamy; leached; few coarse roots.
Bm	- brown; sandy loam to loam; granular struct.; plentiful fine, medium roots.

KEY CHARACTERISTICS

- lack of seepage and/or mottling.
- commonly found on apex or upper slopes; may also develop in fluvial sands.
- H horizon may be lacking.

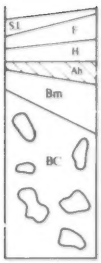
ORTHIC DYSTRIC BRUNISOL (O.DYB)

HORIZON	DESCRIPTION
S,L	- moss layer and discontinuous loose litter; undecomposed.
F	- slightly to moderately decomposed organic horizon; brown to dark brown; matted, felty structure with abundant yellow mycelia.
H	- well-decomposed organic horizon; black; few fine, medium roots.
Bm	- pale brown to brown; loamy sand to loamy; granular structure, up to 50% gravels and cobbles; very few fine roots.
BC	- pale brown to brown; coarse loamy to loamy sand; up to 60% gravels and cobbles; very few fine roots.
C	- yellowish brown; coarse loamy to sandy; gravels and cobbles up to 90%.

KEY CHARACTERISTICS

- typically occurs on fluvial terraces.
- roots are often concentrated in the F horizon.
- Orthic Sombric Brunisols occur, with an Ah horizon greater than 10cm thick.

ORTHIC EUTRIC BRUNISOL (O.EB)



HORIZON	DESCRIPTION
F	- brown; organic horizon with evidence of fungal and/or insect activity; abundant fine, medium roots.
H	- well-decomposed; black organic horizon; abundant medium, coarse roots.
(Ah)	- very dark brown; silt loam; granular; abundant fine roots.
Bm	- dark yellowish brown to brown; loamy; moist to wet; plentiful fine, medium roots.
BC	- yellowish brown; loamy to coarse loamy; moist to wet.

KEY CHARACTERISTICS

- moist to wet soils often receiving seepage.
- soils may by on moralnal blankets or fluvial sands (coarse fragments lacking).
- Ah may not be present.
- organic horizons often relatively thick with increased nutrient status.

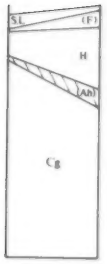
ORTHIC GLEYSOL (O.G)

HORIZON	DESCRIPTION
S,L	- loose, leafy litter and twigs.
H	- well-decomposed, black organic horizon; very few roots.
Ah	- a thin, dark brown to black mineral horizon; silt loam to silty clay loam; abundant fine, medium roots.
Bg	- brownish gray, sandy clay to clay loam; mottles common; angular to massive; wet.
Cg	- olive gray; sandy clay to clay loam; mottles and/or seepage common; massive; wet.

KEY CHARACTERISTICS

- usually found in receiving sites, gullies, and depressions (water table often near surface).
- roots usually concentrated near surface.
- compacted, fine-textured subsurface mineral horizons are common.
- coarse fragments are often lacking.

REGO GLEYSOL (R.G)



HORIZON DESCRIPTION

S,L - thin, continuous litter of alder leaves and fern fronds.
(F) - thin, organic horizon; dark brown; partially decomposed.
H - thick black, organic layer; greasy; massive.
(Ah) - black mineral layer, usually thin; silty; moist.
Cg - very dark gray mineral soil; sandy to clay loam; abundant mottles; wet.

KEY CHARACTERISTICS

- two distinct parent materials are often present (e.g. sands over clay).
- may have incorporation of mineral soil in H layer.
- may have organic veneers (Of and Om) over mineral soil with sedge wetland.
- water table always near surface, mottles usually abundant.

ORTHIC HUMIC GLEYSOL (O.HG)

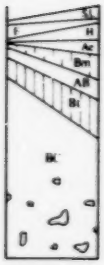
HORIZON DESCRIPTION

S,L - thin continuous litter of alder leaves and fern fronds.
F - thin, fibrous; dark brown; abundant very fine roots.
H - thick, black organic horizon; greasy.
Ah - black mineral soil; silt loam; moist.
BCg - dark grayish brown; loamy; few mottles; wet.
Cg - dark gray; sandy clay; common mottles; wet.

KEY CHARACTERISTICS

- water table often near surface.
- coarse fragments may reach 50% in C layer, but may be completely lacking in all other horizons.

BRUNISOLIC GRAY LUVISOL (BR.GL)



HORIZON	DESCRIPTION
S,L	- loose, discontinuous needle litter.
F	- thin slightly decomposed; brown; fibrous; plentiful fine roots.
H	- thin, well decomposed organic layer; black; greasy and gritty.
Ae	- pale brown; thin mineral soil; silt loam.
Bm	- brown; silt loam to silt.
(AB)	- olive brown to brownish gray; silt loam.
Bt	- dark grayish brown; clay loam; subangular blocky.
BC	- dark gray; silty clay loam; platy.

KEY CHARACTERISTICS

- often local fine-textured material (lacustrine).
- may be mottles present at depth (Bt or BC).
- very few gravel and cobble coarse fragments at depth (BC).
- soil is usually compacted.

ORTHIC GRAY LUVISOL (O.GL)

HORIZON	DESCRIPTION
S,L	- loose, discontinuous needle litter and moss.
F	- thin, fibrous and felty; needle structures still evident.
(H)	- thin, black organic layer; fibrous, greasy; abundant very fine roots.
Ae	- grayish brown; silt to sandy clay loam; few fine, medium roots.
Bt	- brown to dark brown; silty clay to clay loam; subangular blocky.
BC	- dark yellowish brown to dark gray brown; sandy clay loam.

KEY CHARACTERISTICS

- coarse fragments may be lacking.
- organic horizons may be very thin.
- Bt and BC horizons are typically compacted.

PODZOLIC GRAY LUVISOL (PZ.GL)

HORIZON	DESCRIPTION
F	- slightly to moderately decomposed; medium brown; plentiful medium, coarse roots.
H	- well-decomposed; dark brown; some incorporation of mineral soil.
Bf	- yellowish brown (Bf) to brown (Bm); sandy loam to silt loam.
AB	- olive brown to brownish gray; angular to massive structure; may contain mottles.
Bt	- dark grayish brown; loam to clay loam; angular to massive; clay skins may occur on coarse fragments and/or in pores.

KEY CHARACTERISTICS

- horizons in this profile show marked contrast in colours and/or structure.
- effective rooting generally shallow, with most of roots in upper 25cm of mineral soil.
- subsurface horizons may become compact and impenetrable to roots
- mottling may occur in lower horizons (AB and Bt).

TYPIC FOLISOL (TY.FO)

HORIZON	DESCRIPTION
S,L	- loose, undecomposed litter, with a continuous moss layer.
F	- thick, partially decomposed; medium brown; fibrous; plentiful very fine roots.
H	- thin, well-decomposed; dark brown; fibrous; plentiful very fine roots.
R	- weathered bedrock composed of large angular coarse fragments and/or bedrock.

KEY CHARACTERISTICS

- a thin mineral soil layer (less than half of organic layers) may occur.
- interstices may be filled or partially filled with organic material.

TYPIC MESISOL (TY.M)

HORIZON	DESCRIPTION
S,L	- surface of thick, continuous Sphagnum moss or sedge material.
(Of)	- poorly decomposed organic material (usually Sphagnum moss and/or sedge leaves); 40% or greater rubbed fibre by volume.
Om	- partially decomposed organic material; 10-40% rubbed fibre by volume.

KEY CHARACTERISTICS

- water is often present below 40cm, then it becomes Hydric Mesisol.
- if mesic layer is not present (entire profile of Of) then Typic Fibrisol.
- if mineral soil is found (greater than 40cm thick) below 40 cm then Terric Mesisol or Terric Fibrisol.

ORTHIC FERRO-HUMIC PODSOL (O.FHP)

HORIZON	DESCRIPTION
S,L	- predominantly loose coniferous needles.
F	- partially decomposed; medium brown; fibrous; plentiful very fine, fine roots.
H	- thin, well-decomposed; dark brown; gritty, greasy.
(Ae)	- often discontinuous; sandy loam to silt loam.
Bhf	- dark reddish brown; sandy loam to sandy clay loam; few fine, medium roots.
BC	- dark yellowish brown to dark grayish brown; sandy loam to silt loam.
C	- dark grayish brown to dark gray; sandy loam to sandy clay loam.

KEY CHARACTERISTICS

- coarse fragments usually throughout profile, may reach a maximum of 70% in the C layer.
- parent materials are often fine-grained sedimentary; gives dark colour to entire profile.
- a Bf horizon may occur beneath the Bhf.

ORTHIC HUMO-FERRIC PODZOL (O.HFP)

HORIZON	DESCRIPTION
S,L	- loose needle litter and mosses.
F	- partially decomposed , dark brown; fibrous, felty with often abundant white and/or yellow mycelia; common very fine, fine roots.
(H)	- very thin, well-decomposed; dark brown; greasy.
(Ae)	- often discontinuous, thin mineral soil; loamy sand to clay loam.
Bf	- reddish yellow to strong brown; loamy sand to silt loam; often large amount of coarse fragments.
BC	- yellowish brown to dark brown; sandy loam to silt loam.
C	- dark gray to brown; may be lithic contact.

KEY CHARACTERISTICS

- weathered rock may occur within 50cm of surface.
- soils are typically skeletal with up to 70% coarse fragments in the C; Bf may have high percentage also due to washing of surface material.
- soils also develop in fluvial material, no large coarse fragments, however, will be present.

ORTHIC REGOSOL (O.R)

HORIZON	DESCRIPTION
S,L	- leafy, needly litter with few mosses.
F	- thin, medium brown; felty, fibrous.
H	- very thin, dark brown; fibrous.
IC	- usually fine sandy material; very well-drained; very dark gray to black.
IIC	- coarse sands often with a high percentage of gravels; rapidly drained.

KEY CHARACTERISTICS

- soils typically occur on fluvial fans and flood-plains; floodplains also exhibit Cumulic Regosols (interspersed H and C horizons indicating recurrent deposition by flooding).
- mottles may be found at depth and water tables are often high.